

Appendix A of data

A1.Maximum Peak Conducted Output Power

Test Result

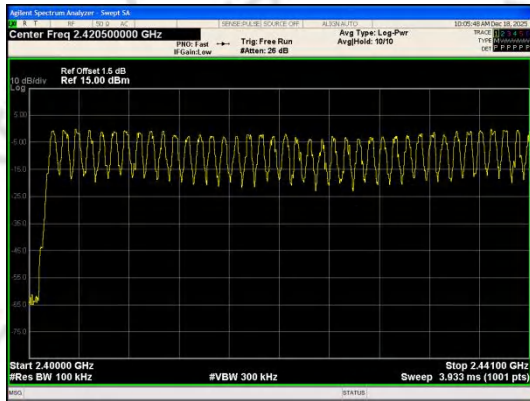
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	2.05	1.603	≤21	PASS
		39	2.03	1.596		PASS
		78	0.91	1.233		PASS
π/4DQPSK	2-DH5	0	0.90	1.230		PASS
		39	1.55	1.429		PASS
		78	-0.99	0.796		PASS
8DPSK	3-DH5	0	2.62	1.828		PASS
		39	1.04	1.271		PASS
		78	2.33	1.710		PASS

A2.Number of Hopping Frequencies

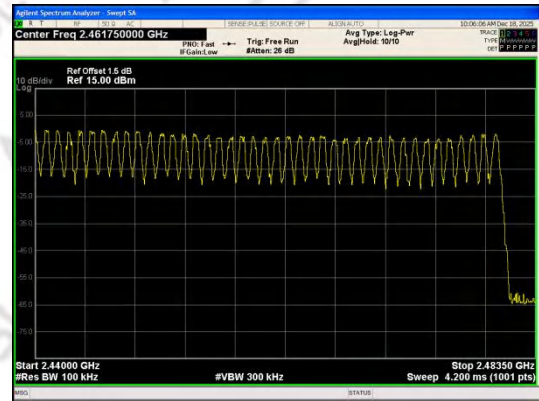
Test Result

Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
$\pi/4$ DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

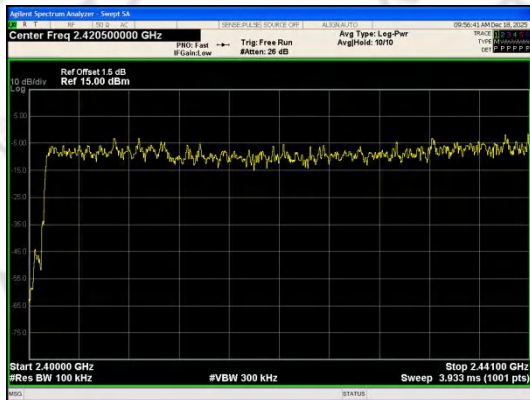
Test Graphs



Low End Spectrum Channel Hopping Plot
GFSK



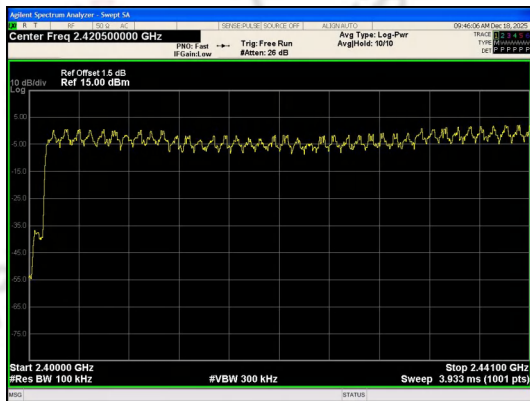
High End Spectrum Channel Hopping Plot
GFSK



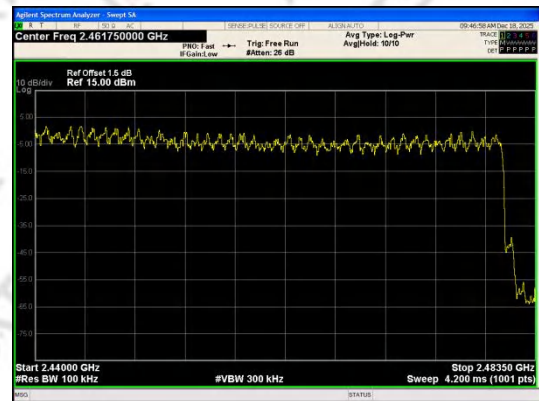
Low End Spectrum Channel Hopping Plot
 $\pi/4$ DQPSK



High End Spectrum Channel Hopping Plot
 $\pi/4$ DQPSK



Low End Spectrum Channel Hopping Plot
8DPSK



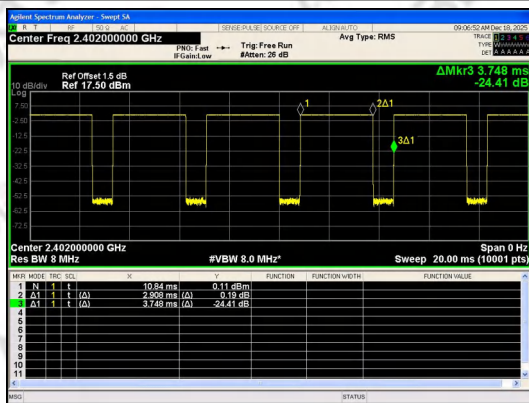
High End Spectrum Channel Hopping Plot
8DPSK

A3.Duty Cycle and Dwell Time

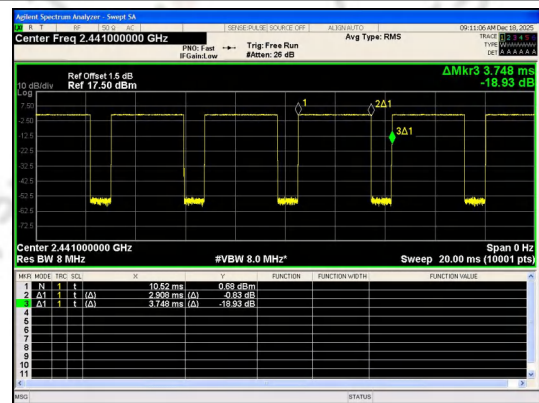
Duty Cycle Test Result

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)
GFSK	DH5	0	2.908	3.748	77.59	0.7759	1.1019
		39	2.908	3.748	77.59	0.7759	1.1019
		78	2.908	3.748	77.59	0.7759	1.1019
$\pi/4$ DQPSK	2-DH5	0	2.898	3.748	77.32	0.7732	1.1171
		39	2.898	3.748	77.32	0.7732	1.1171
		78	2.898	3.748	77.32	0.7732	1.1171
8DPSK	3-DH5	0	2.898	3.748	77.32	0.7732	1.1171
		39	2.898	3.748	77.32	0.7732	1.1171
		78	2.896	3.748	77.27	0.7727	1.1199

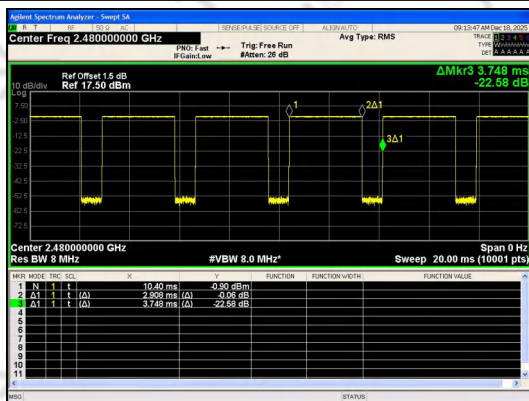
Test Graphs



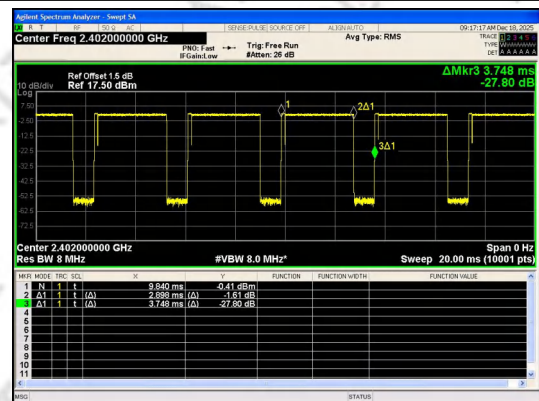
GFSK(DH5)_Channel 0

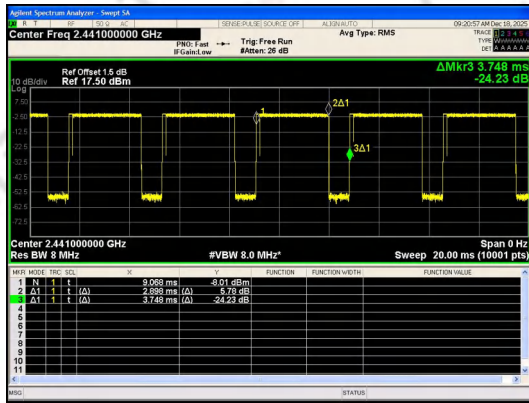
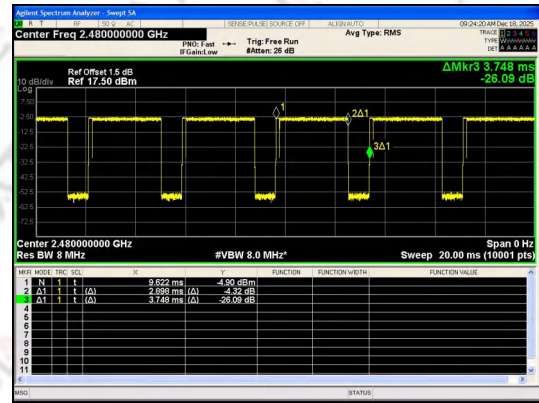


GFSK(DH5)_Channel 39



GFSK(DH5)_Channel 78

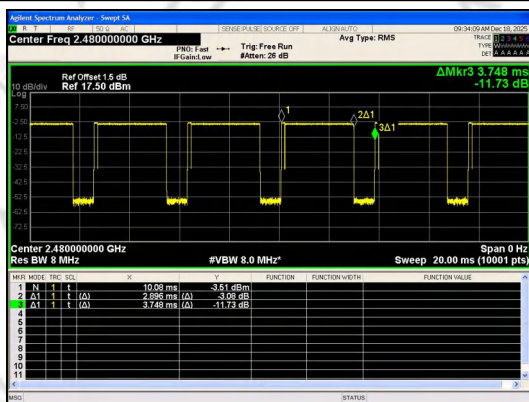

 $\pi/4$ DQPSK(2-DH5)_Channel 0


 $\pi/4$ DQPSK(2-DH5)_Channel 39

 $\pi/4$ DQPSK(2-DH5)_Channel 78


8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39



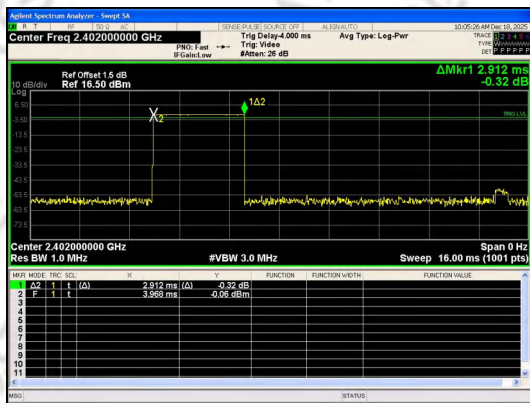
8DPSK(3-DH5)_Channel 78

Dwell Time Test Result

Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	0	2.912	104	302.85	< 400	PASS
$\pi/4$ DQPSK	2-DH5	0	2.896	99	286.7		PASS
8DPSK	3-DH5	0	2.896	107	309.87		PASS

Note: Dwell time=Pulse time(ms)*Number of Pulses in 31.6 seconds

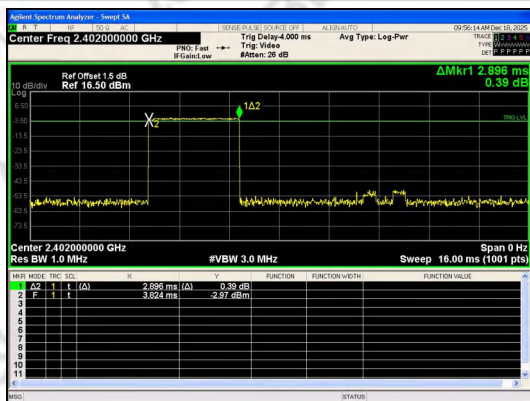
Test Graphs



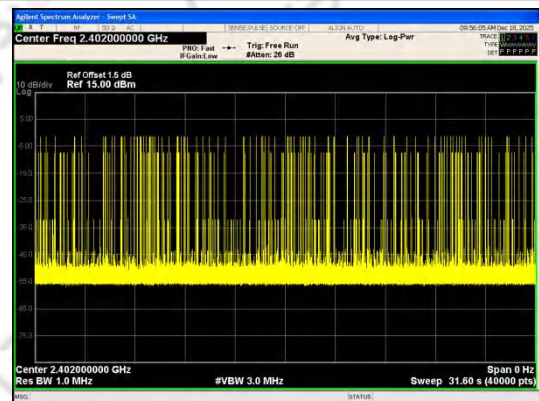
Pulse Width
GFSK_DH5



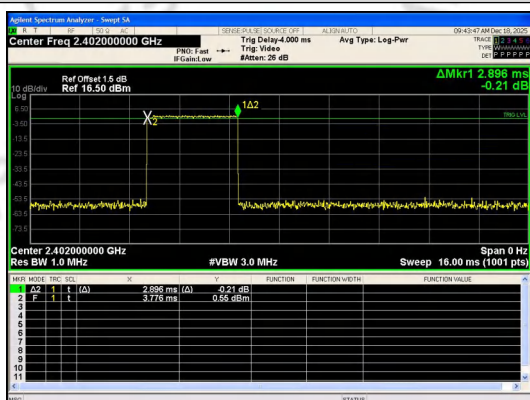
Number of Pulses in 31.6 seconds
GFSK_DH5



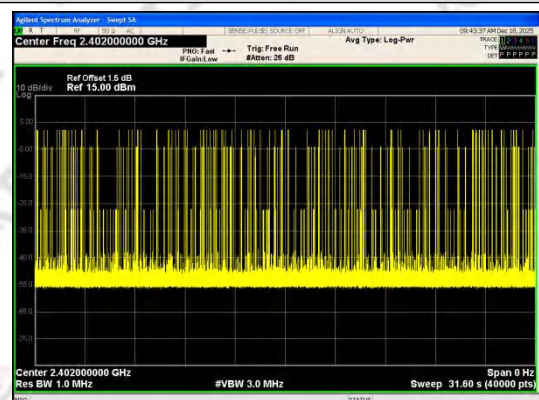
Pulse Width
 $\pi/4$ DQPSK_2-DH5



Number of Pulses in 31.6 seconds
 $\pi/4$ DQPSK_2-DH5



Pulse Width



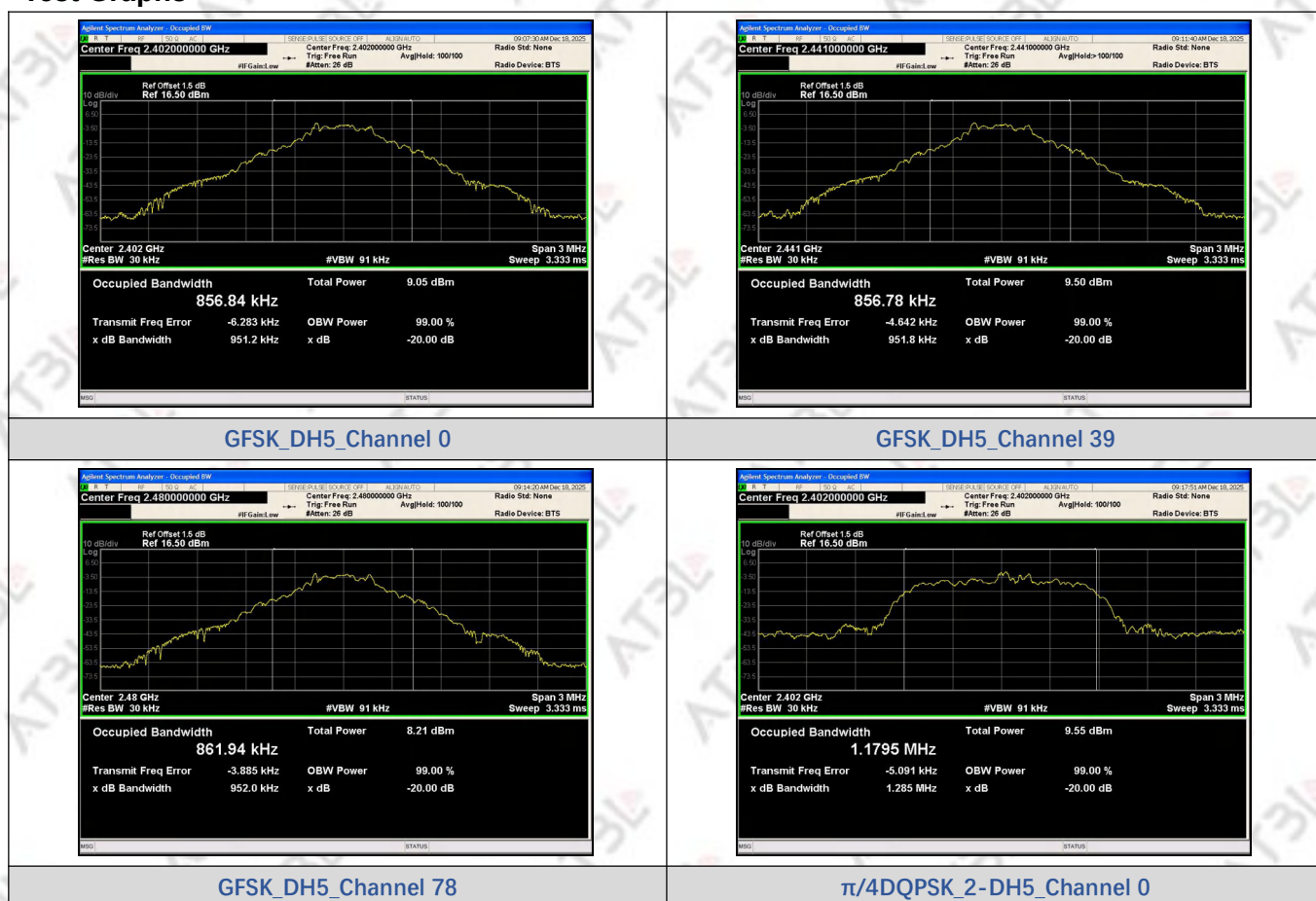
Number of Pulses in 31.6 seconds

A4.20dB Bandwidth

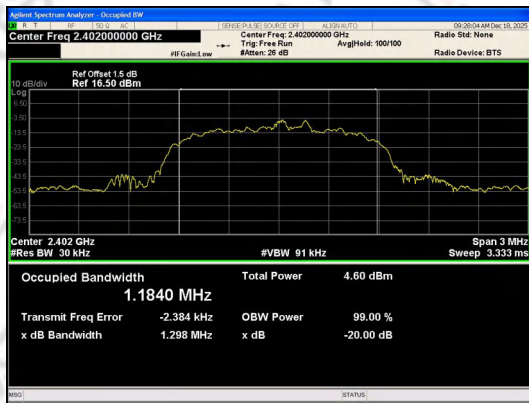
Test Result

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.9512
	39	2441 MHz	0.9518
	78	2480 MHz	0.9520
$\pi/4$ DQPSK	0	2402 MHz	1.285
	39	2441 MHz	1.287
	78	2480 MHz	1.283
8DPSK	0	2402 MHz	1.298
	39	2441 MHz	1.300
	78	2480 MHz	1.298

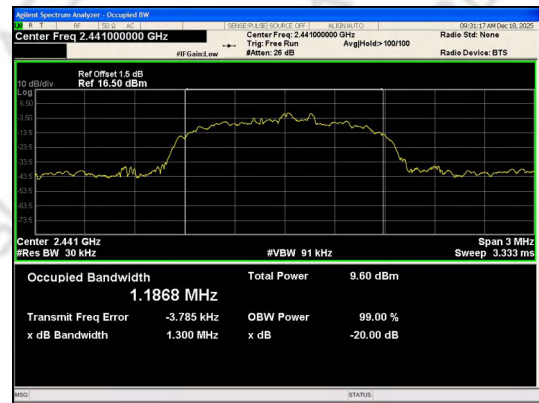
Test Graphs




 $\pi/4$ DQPSK_2-DH5_Channel 39

 $\pi/4$ DQPSK_2-DH5_Channel 78


8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



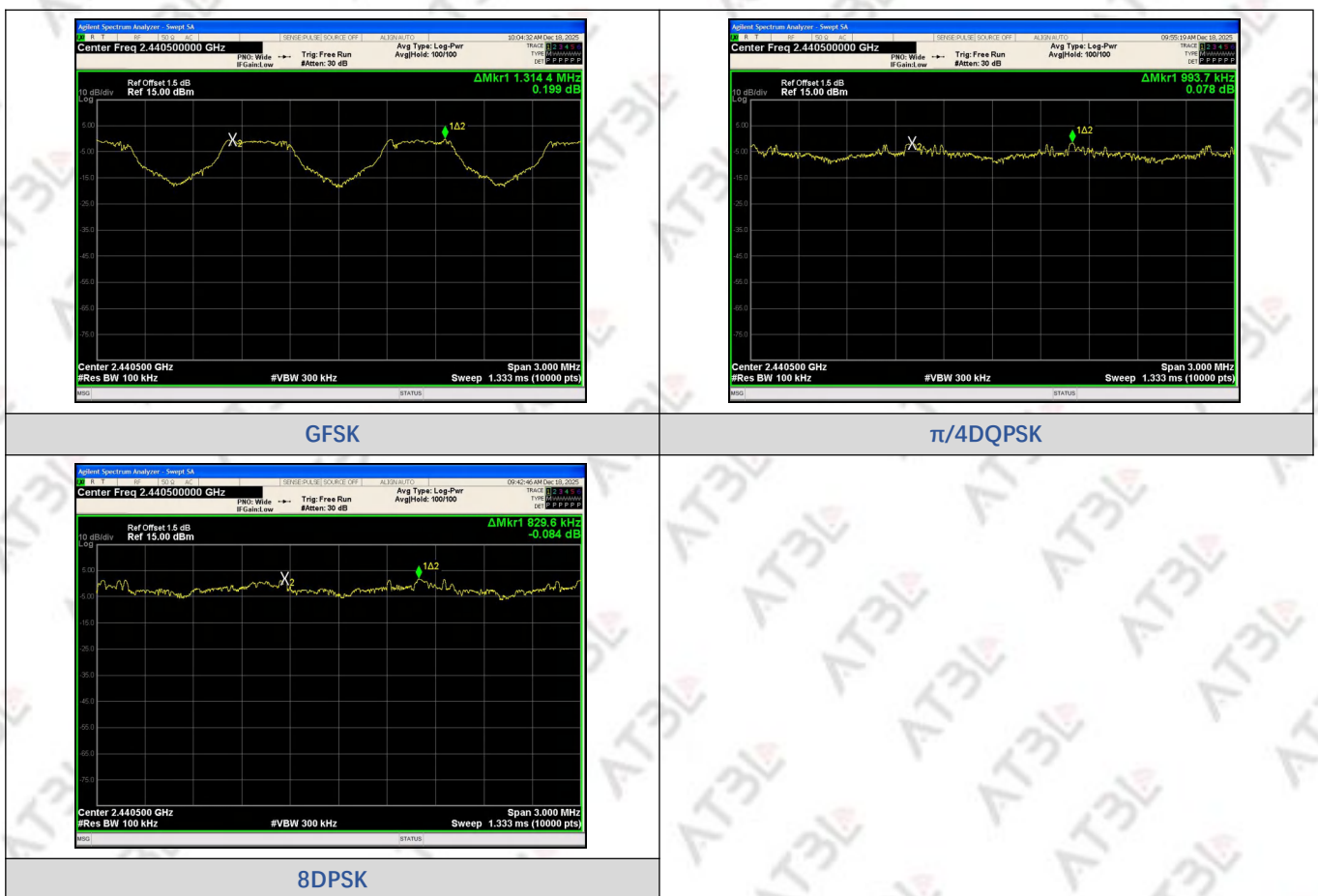
8DPSK_3-DH5_Channel 78

A5.Carrier Frequencies Separation

Test Result

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Minimum Limit (MHz)	Result
GFSK	DH5	2439.8419	2441.1563	1.3144	0.634	PASS
$\pi/4$ DQPSK	2-DH5	2440.0009	2440.9946	0.9937	0.858	PASS
8DPSK	3-DH5	2440.1659	2440.9955	0.8296	0.866	PASS

Test Graphs



A6.Conducted Band Edge and Conducted Spurious Emission

Test Result

Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2400.00	-61.526	-18.28	-43.246	PASS
			24991.9	-51.797	-18.28	-33.517	PASS
		39	24908.9	-51.199	-18.2	-32.999	PASS
		78	2483.50	-60.883	-19.26	-41.623	PASS
			24998.1	-52.635	-19.26	-33.374	PASS
$\pi/4$ DQPSK	2-DH5	0	2400.00	-55.786	-17.96	-37.826	PASS
			24968.8	-52.379	-17.96	-34.419	PASS
		39	24812.1	-52.536	-20.64	-31.896	PASS
		78	2483.50	-62.199	-23.21	-38.989	PASS
			24575.5	-52.335	-23.21	-29.125	PASS
8DPSK	3-DH5	0	2400.00	-57.670	-22.98	-34.690	PASS
			24952.6	-52.276	-22.98	-29.296	PASS
		39	24926.3	-52.756	-17.92	-34.836	PASS
		78	2483.50	-62.650	-19.92	-42.730	PASS
			24955.0	-51.825	-19.92	-31.905	PASS

Note: input compensation coefficient (dB)= Cable Loss (dB)

Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2400.00	-58.908	-20.14	-38.768	PASS
			2483.50	-61.661	-21.93	-39.731	PASS
$\pi/4$ DQPSK	2-DH5		2400.00	-58.959	-22.85	-36.109	PASS
			2483.50	-62.970	-23.61	-39.360	PASS
8DPSK	3-DH5		2400.00	-53.956	-19.73	-34.226	PASS
			2483.50	-61.884	-20.35	-41.534	PASS

Note: input compensation coefficient (dB)= Cable Loss (dB)

Test Graphs

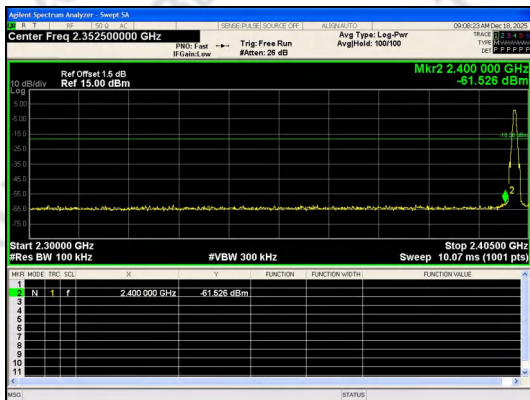
Non-Hopping



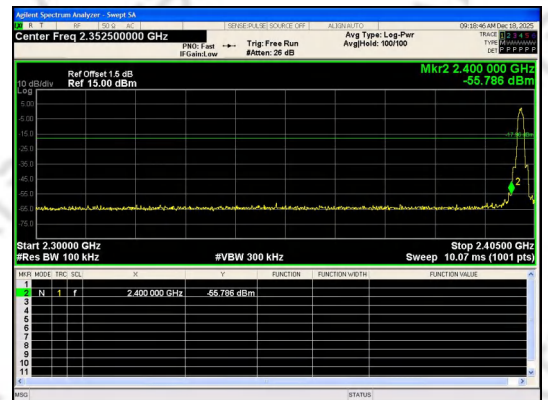
In-Band Reference Level
GFSK_DH5_Channel 0



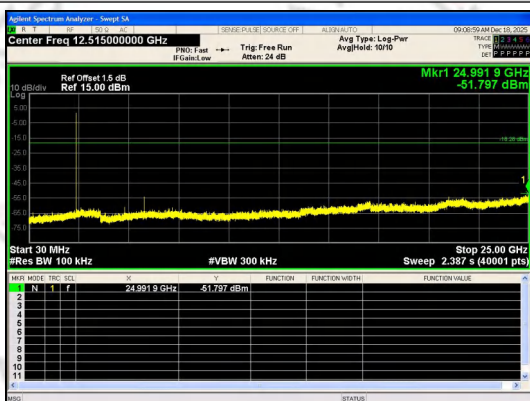
In-Band Reference Level
 $\pi/4$ DQPSK_2-DH5_Channel 0



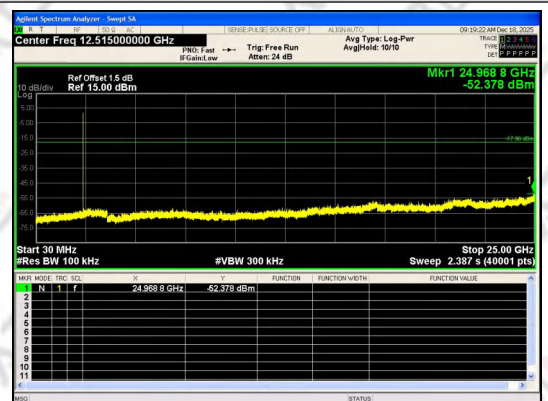
Out Of Band Emission
GFSK_DH5_Channel 0



Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 0



30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 0



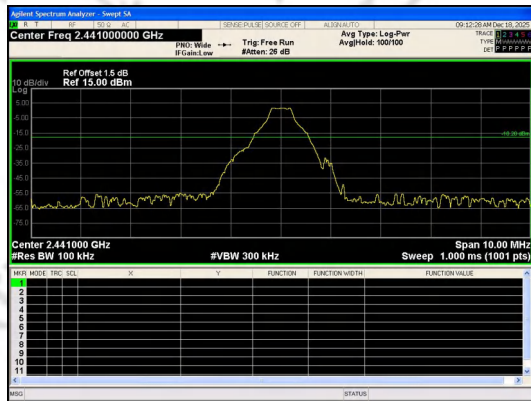
30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 0



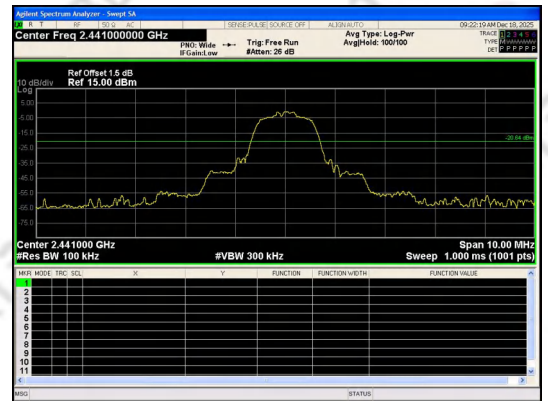
In-Band Reference Level
GFSK_DH5_Channel 39



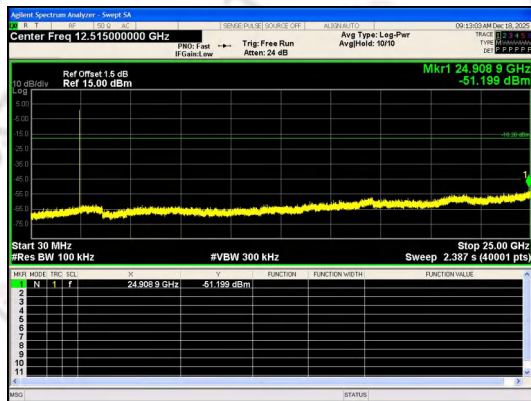
In-Band Reference Level
 $\pi/4$ DQPSK_2-DH5_Channel 39



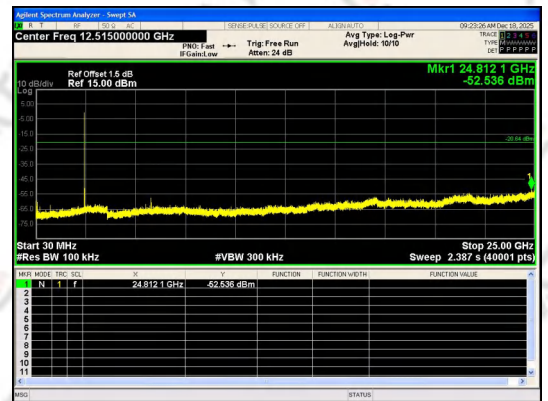
Out Of Band Emission
GFSK_DH5_Channel 39



Out Of Band Emission
 $\pi/4$ DQPSK_2-DH5_Channel 39



30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39

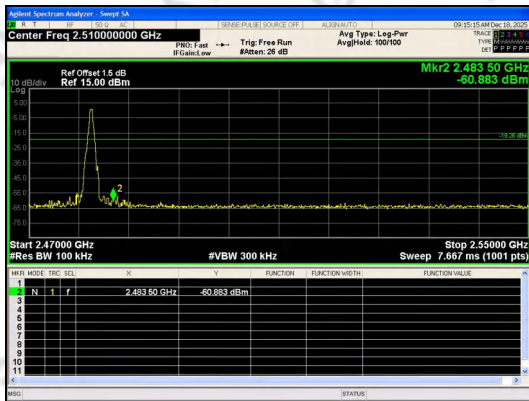


30.0 MHz - 25000.0 MHz
 $\pi/4$ DQPSK_2-DH5_Channel 39

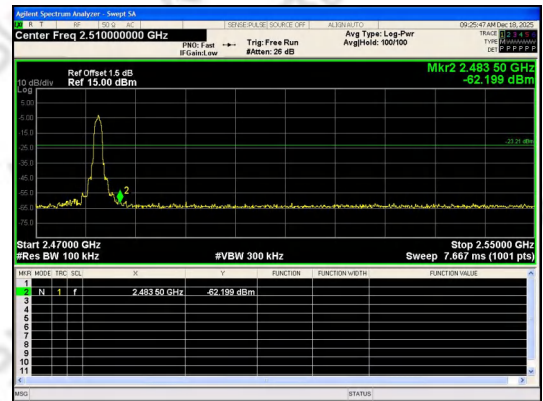


In-Band Reference Level

GFSK_DH5_Channel 78

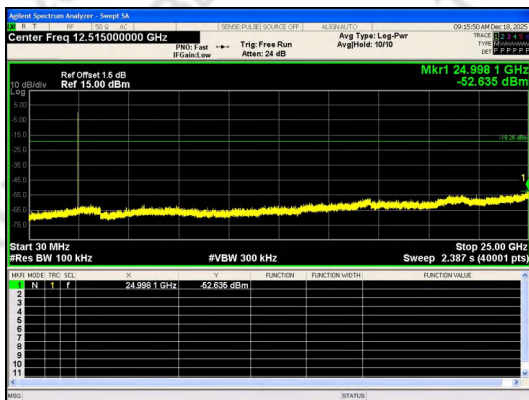


In-Band Reference Level

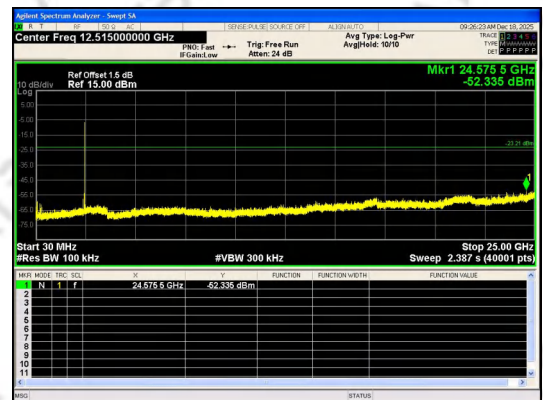
 $\pi/4$ DQPSK_2-DH5_Channel 78


Out Of Band Emission

GFSK_DH5_Channel 78



Out Of Band Emission

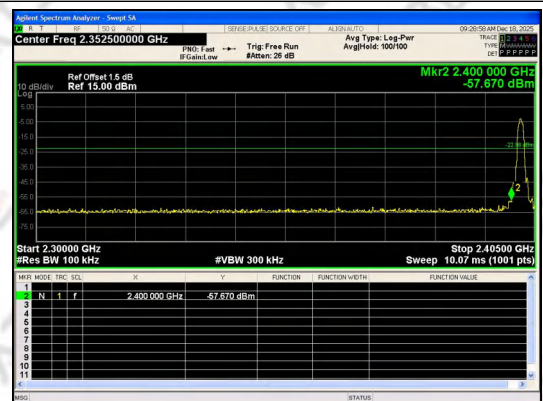
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30.0 MHz - 25000.0 MHz

GFSK_DH5_Channel 78



30.0 MHz - 25000.0 MHz

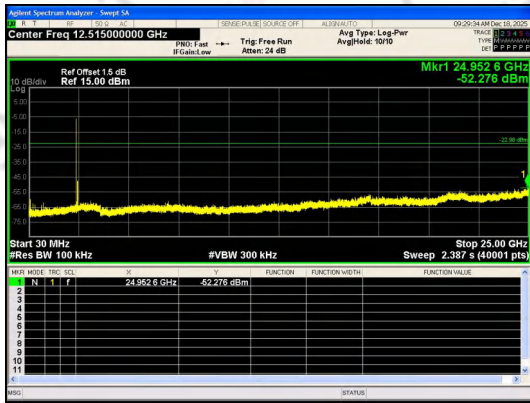
 $\pi/4$ DQPSK_2-DH5_Channel 78


In-Band Reference Level

8DPSK_3-DH5_Channel 0

Out Of Band Emission

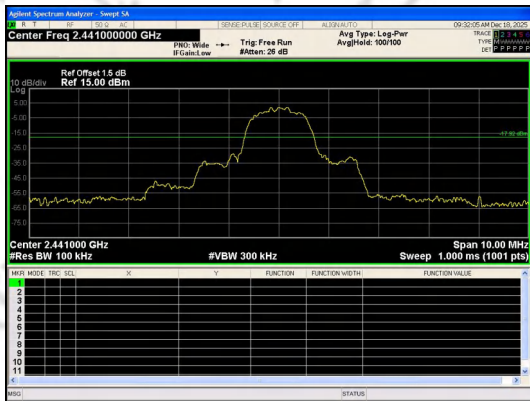
8DPSK_3-DH5_Channel 0



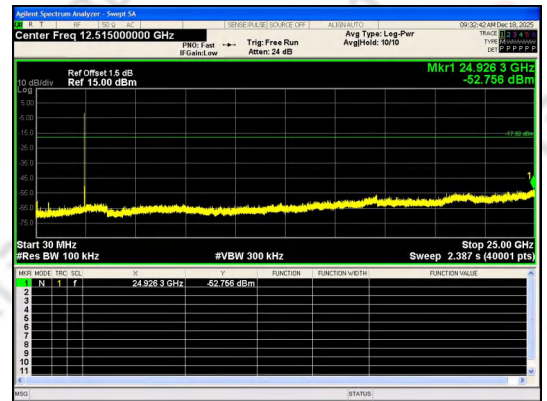
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



In-Band Reference Level
8DPSK_3-DH5_Channel 39



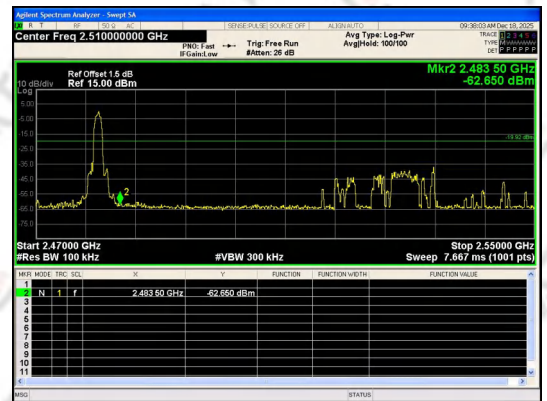
Out Of Band Emission
8DPSK_3-DH5_Channel 39



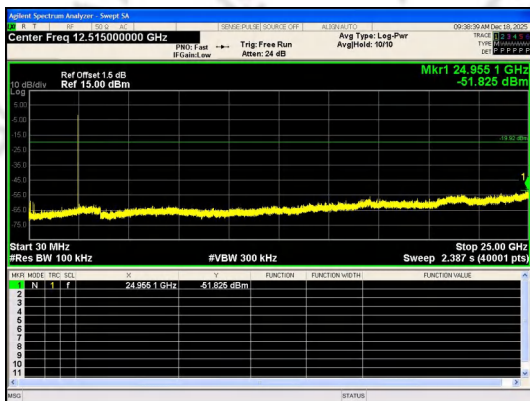
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



In-Band Reference Level
8DPSK_3-DH5_Channel 78



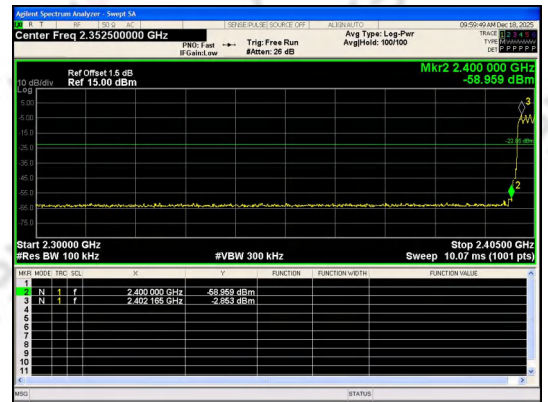
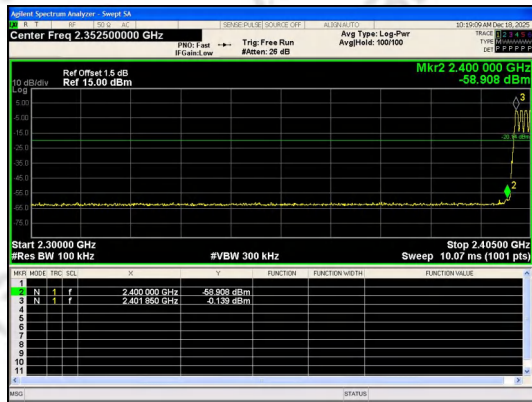
Out Of Band Emission
8DPSK_3-DH5_Channel 78



30.0 MHz - 25000.0 MHz

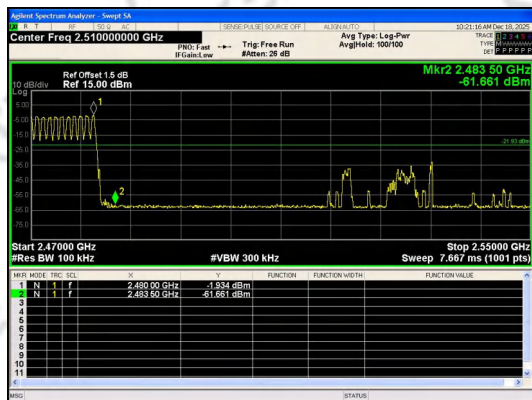
8DPSK_3-DH5_Channel 78

Hopping

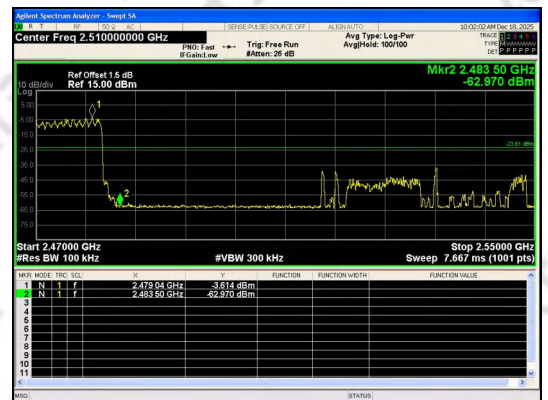


Out Of Band Emission(Left)

GFSK_DH5_Channel Hopping

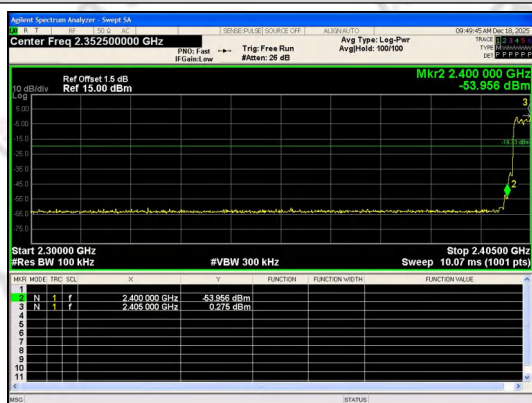


Out Of Band Emission(Left)

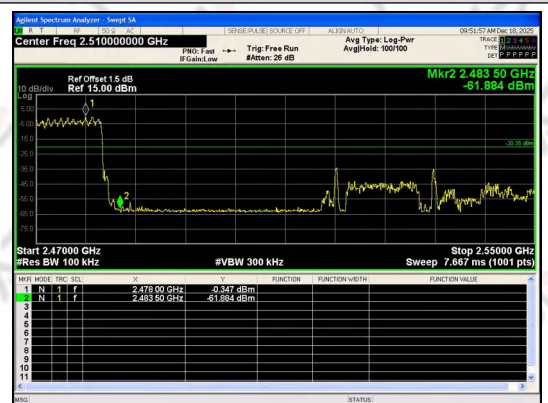
 $\pi/4$ DQPSK_2-DH5_Channel Hopping


Out Of Band Emission(Right)

GFSK_DH5_Channel Hopping



Out Of Band Emission(Right)

 $\pi/4$ DQPSK_2-DH5_Channel Hopping


Out Of Band Emission(Left)

8DPSK_3-DH5_Channel Hopping

Out Of Band Emission(Right)

8DPSK_3-DH5_Channel Hopping

A7.Radiated Spurious Emission and Restricted Band

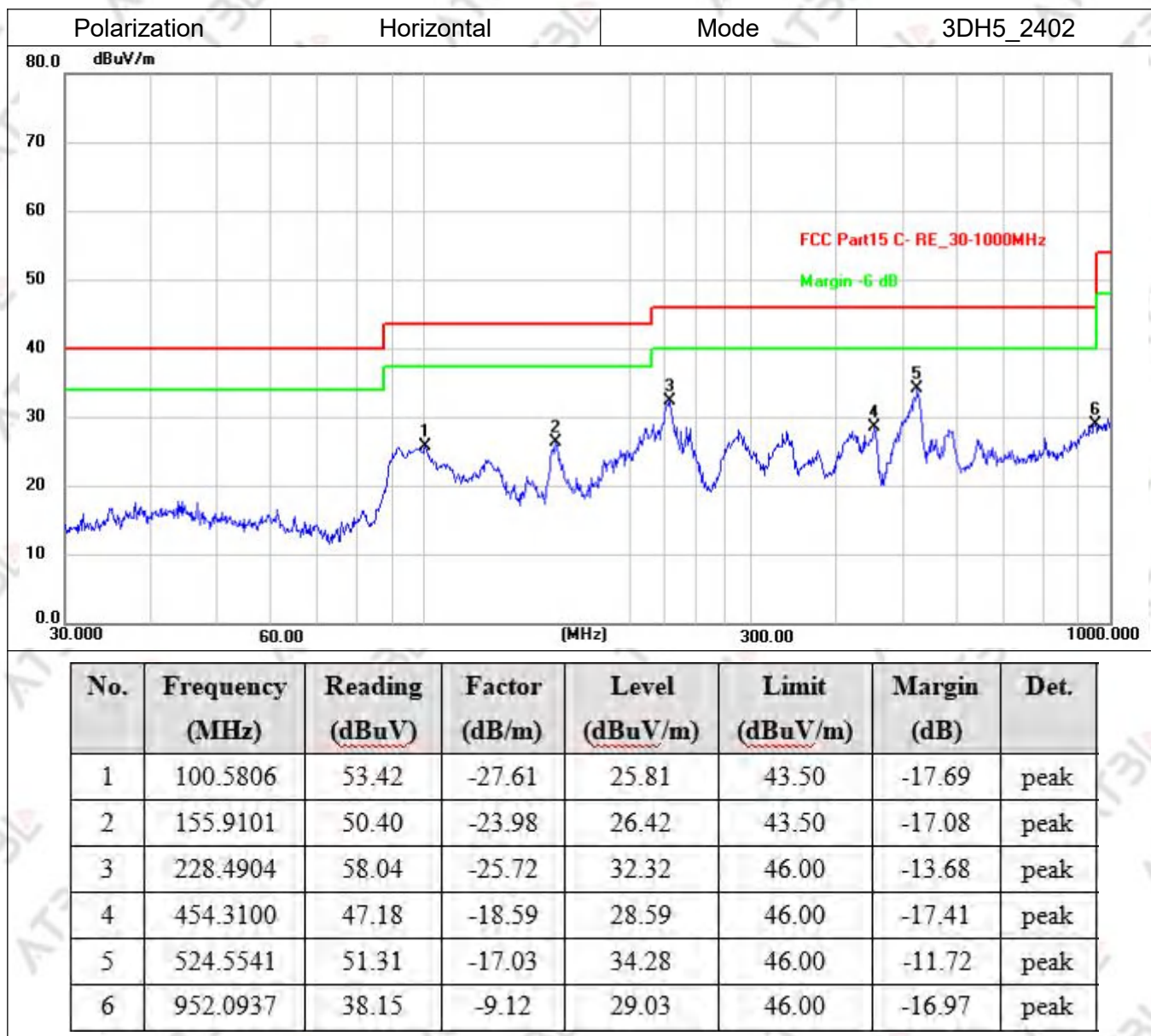
For 9 kHz ~ 30 MHz

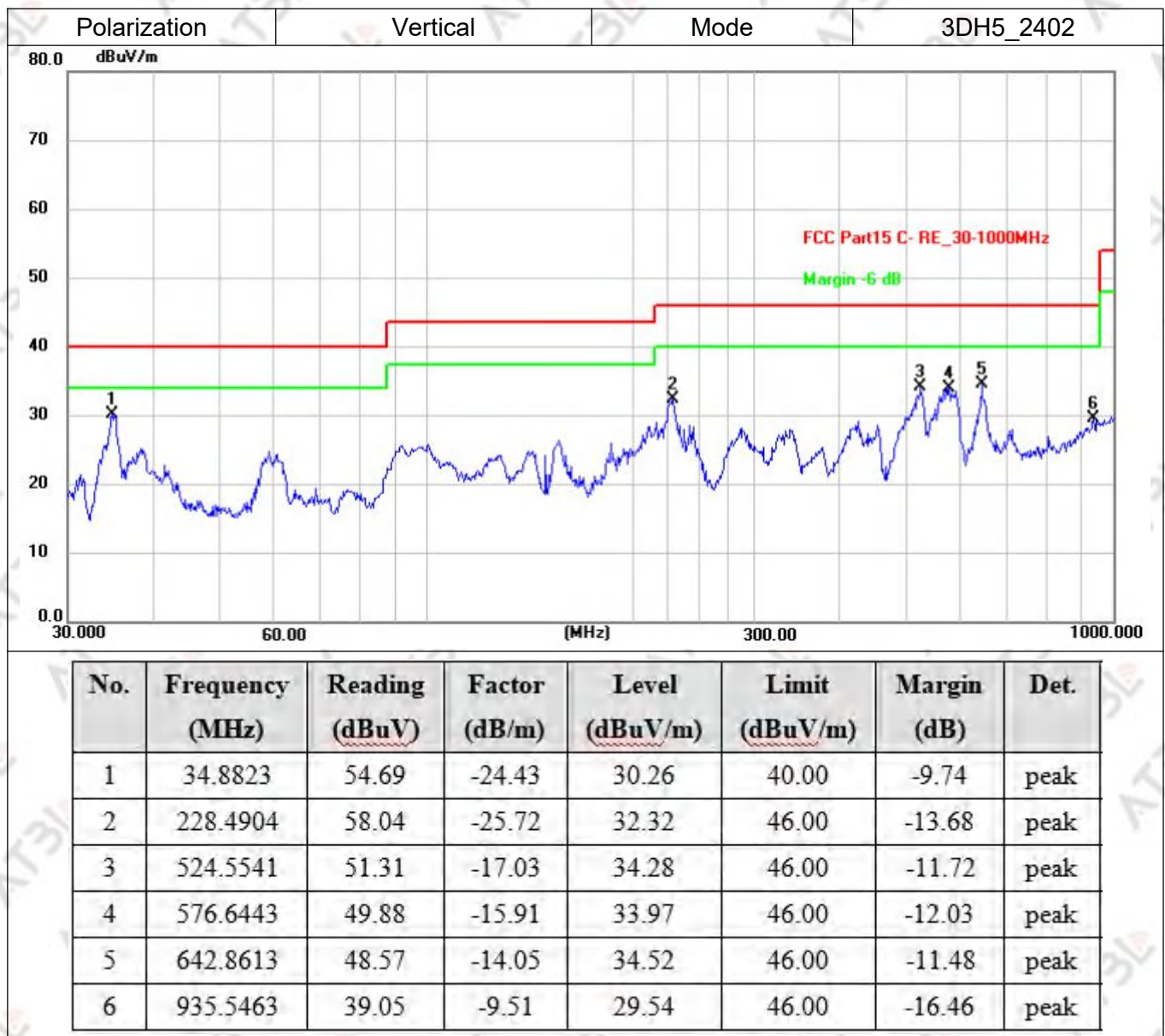
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

For 30 MHz ~ 1 GHz:

Note:

- 1.All modes have been tested, only worst mode(3DH5_2402MHz) was recorded in the test report.
- 2.Emission Level (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Amplifier Gain.
4. The emission levels of other frequencies were less than 20dB margin against the limit.
5. Margin value = Emission level-Limit value.





For 1 GHz ~ 18GHz:

Note:

1. In frequency ranges 18 ~25GHz no any other harmonic emissions detected which are tested to compliance with the limit. No recording in the test report. No any other emissions level which are attenuated less than 20dB below the limit. No recording in the test report.
2. We used the filter to test and the main frequency was filtered out.
3. Emission Level (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
4. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)-Amplifier Gain.
5. The emission levels of other frequencies were less than 20dB margin against the limit.
6. Margin value = Emission level-Limit value.
7. All modes have been tested, only worst mode(DH5 and 3DH5) was recorded in the test report.

Test Mode: DH5							
Test Channel:Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	60.71	-1.47	59.24	74.00	-14.76	peak	Pass
4804.000	48.95	-1.38	47.57	54.00	-6.43	AV	Pass
7206.000	46.10	8.42	54.52	74.00	-19.48	peak	Pass
7206.000	34.38	8.42	42.80	54.00	-11.20	AV	Pass
Test Channel:Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	67.78	-14.52	53.26	74.00	-20.74	peak	Pass
4804.000	52.75	-14.51	38.24	54.00	-15.76	AVG	Pass
7206.000	45.79	8.42	54.21	74.00	-19.79	peak	Pass
7206.000	33.91	8.42	42.33	54.00	-11.67	AVG	Pass
Test Channel:Middle channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4882.000	69.41	-14.52	54.89	74.00	-19.11	peak	Pass
4882.000	52.43	-14.51	37.92	54.00	-16.08	AV	Pass
7323.000	45.87	8.42	54.29	74.00	-19.71	peak	Pass
7323.000	33.54	8.42	41.96	54.00	-12.04	AV	Pass
Test Channel: Middle channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4882.000	61.12	-1.12	60.00	74.00	-14.00	peak	Pass
4882.000	49.82	-1.03	48.79	54.00	-5.21	AV	Pass

7323.000	46.44	8.42	54.86	74.00	-19.14	peak	Pass
7323.000	33.52	8.42	41.94	54.00	-12.06	AV	Pass
Test Channel:Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	63.81	-0.70	63.11	74.00	-10.89	peak	Pass
4960.000	51.80	-0.61	51.19	54.00	-2.81	AV	Pass
7440.000	33.38	14.03	47.41	54.00	-6.59	peak	Pass
7440.000	44.22	14.08	58.30	74.00	-15.70	AV	Pass
Test Channel:Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	55.03	-0.70	54.33	74.00	-19.67	peak	Pass
4960.000	43.34	-0.61	42.73	54.00	-11.27	AV	Pass
7440.000	46.36	8.42	54.78	74.00	-19.22	peak	Pass
7440.000	33.42	8.42	41.84	54.00	-12.16	AV	Pass

Test Mode: 3DH5							
Test Channel:Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	50.23	-1.47	48.76	74.00	-25.24	peak	Pass
4804.000	36.37	-1.38	34.99	54.00	-19.01	AV	Pass
7206.000	45.64	8.42	54.06	74.00	-19.94	peak	Pass
7206.000	33.53	8.42	41.95	54.00	-12.05	AV	Pass
Test Channel:Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4804.000	60.63	-1.47	59.16	74.00	-14.84	peak	Pass
4804.000	47.77	-1.38	46.39	54.00	-7.61	AVG	Pass
7206.000	46.21	8.42	54.63	74.00	-19.37	peak	Pass
7206.000	34.03	8.42	42.45	54.00	-11.55	AVG	Pass
Test Channel:Middle channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4882.000	61.33	-1.12	60.21	74.00	-13.79	peak	Pass
4882.000	49.50	-1.03	48.47	54.00	-5.53	AV	Pass
7323.000	45.97	8.42	54.39	74.00	-19.61	peak	Pass
7323.000	33.53	8.42	41.95	54.00	-12.05	AV	Pass
Test Channel: Middle channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4882.000	45.74	8.42	54.16	74.00	-19.84	peak	Pass
4882.000	34.16	8.42	42.58	54.00	-11.42	AV	Pass
7323.000	41.30	19.54	60.84	74.00	-13.16	peak	Pass
7323.000	31.72	19.54	51.26	54.00	-2.74	AV	Pass
Test Channel:Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	46.28	8.42	54.70	74.00	-19.30	peak	Pass
4960.000	33.54	8.42	41.96	54.00	-12.04	AV	Pass
7440.000	43.24	17.58	60.82	74.00	-13.18	peak	Pass
7440.000	32.34	17.68	50.02	54.00	-3.98	AV	Pass
Test Channel:Highest channel, Test Polarization: Horizontal							

Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
4960.000	60.95	-0.70	60.25	74.00	-13.75	peak	Pass
4960.000	47.64	-0.61	47.03	54.00	-6.97	AV	Pass
7440.000	43.89	10.68	54.57	74.00	-19.43	peak	Pass
7440.000	33.61	10.68	44.29	54.00	-9.71	AV	Pass

Test Result of Restricted Band

Note:

All modes have been tested, only worst case(DH5 and 3DH5)mode was recorded in the test report.

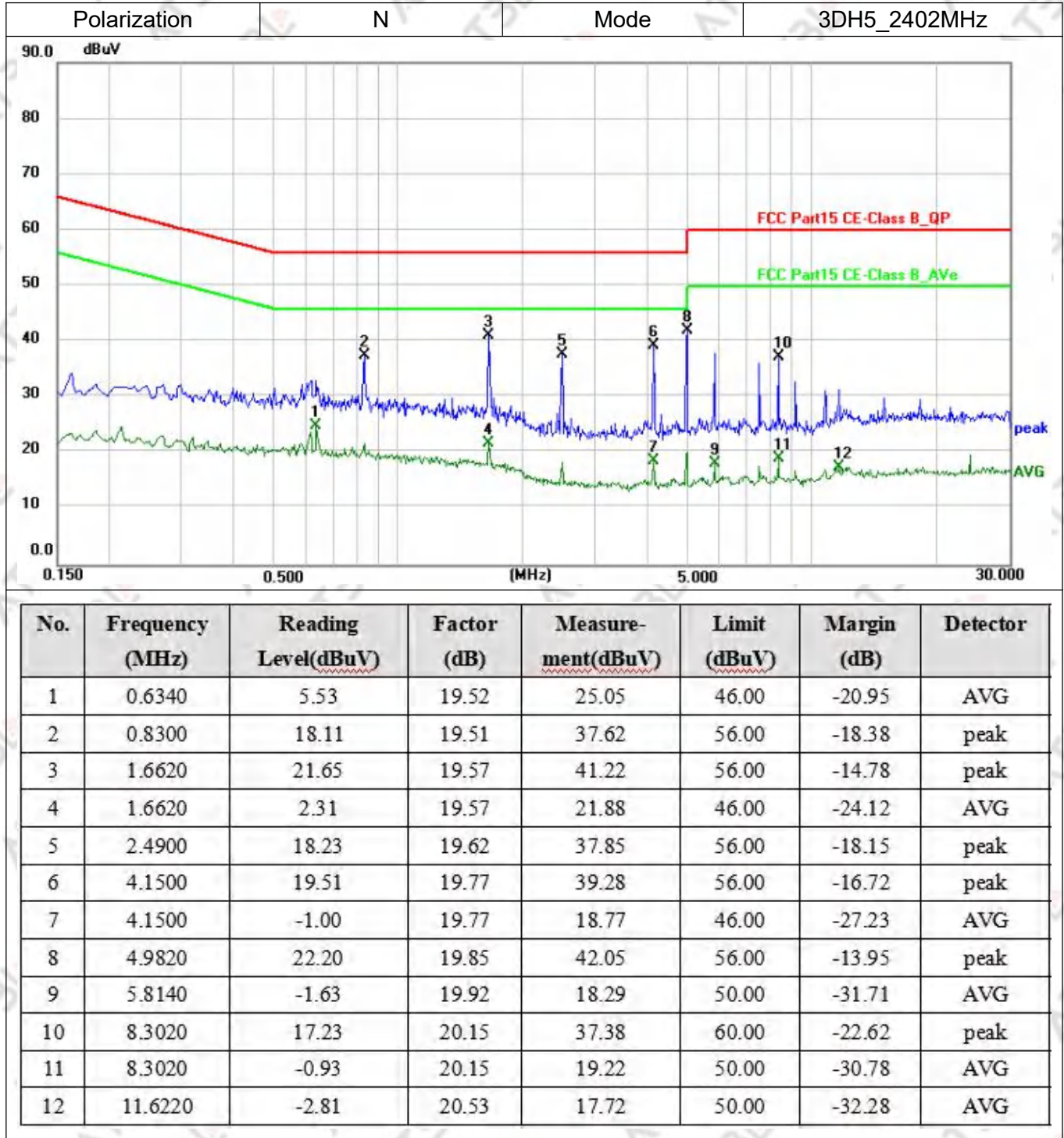
Test Mode: DH5							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.000	44.92	-10.95	33.97	74.00	-40.03	peak	Pass
2310.000	35.85	-10.95	24.90	54.00	-29.10	AV	Pass
2390.000	49.42	-10.86	38.56	74.00	-35.44	peak	Pass
2390.000	38.14	-10.86	27.28	54.00	-26.72	AV	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.000	44.27	-10.95	33.32	74.00	-40.68	peak	Pass
2310.000	34.97	-10.95	24.02	54.00	-29.98	AV	Pass
2390.000	57.49	-10.86	46.63	74.00	-27.37	peak	Pass
2390.000	40.89	-10.86	30.03	54.00	-23.97	AV	Pass
Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.500	59.52	-10.34	49.18	74.00	-24.82	peak	Pass
2483.500	42.35	-10.34	32.01	54.00	-21.99	AV	Pass
2500.000	44.49	-10.24	34.25	74.00	-39.75	peak	Pass
2500.000	35.43	-10.24	25.19	54.00	-28.81	AV	Pass
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.500	51.40	-10.34	41.06	74.00	-32.94	peak	Pass
2483.500	37.09	-10.34	26.75	54.00	-27.25	AV	Pass
2500.000	45.68	-10.24	35.44	74.00	-38.56	peak	Pass
2500.000	36.90	-10.24	26.66	54.00	-27.34	AV	Pass

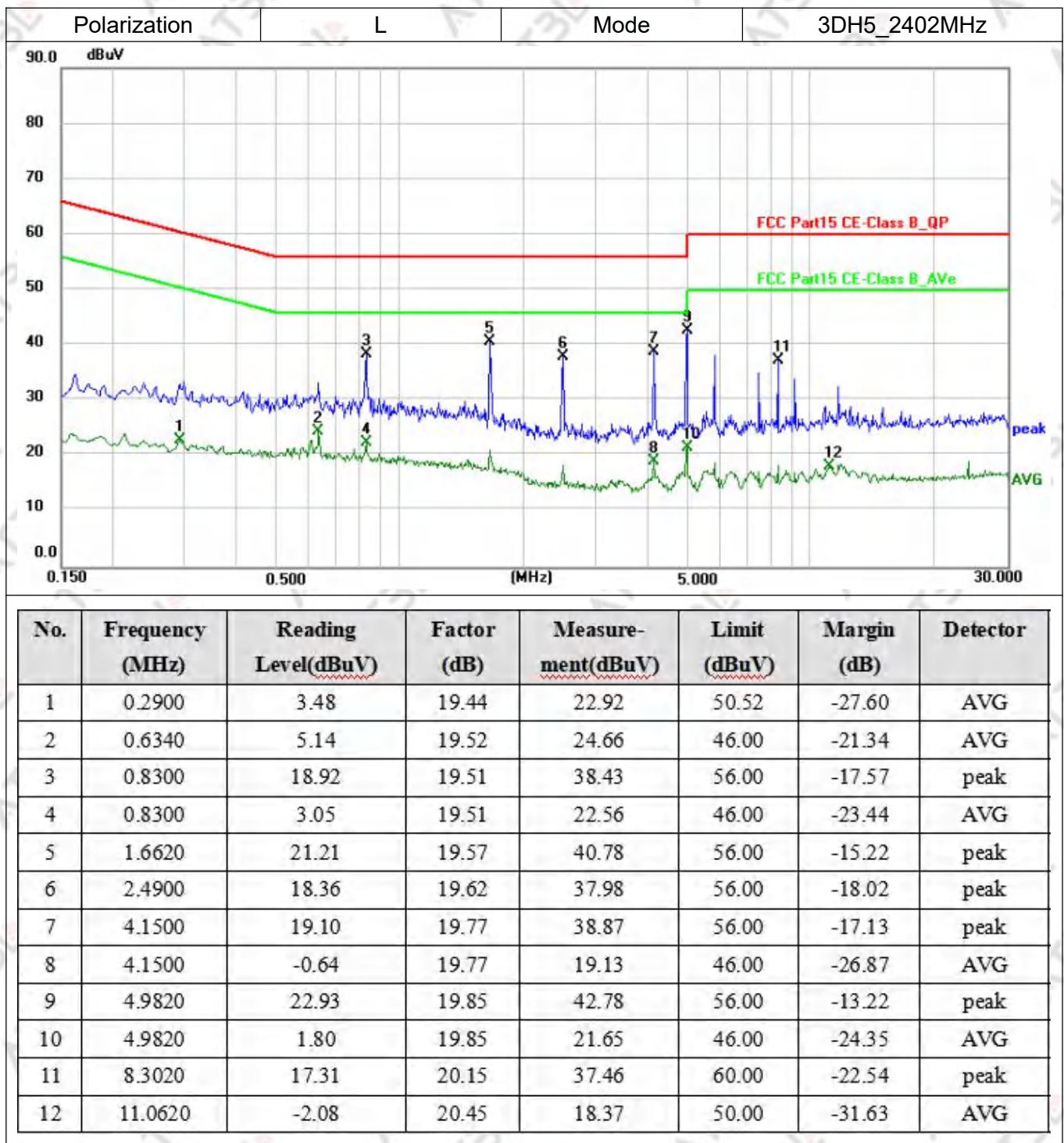
Test Mode: 3DH5							
Test Channel: Lowest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.000	46.13	-10.95	35.18	74.00	-38.82	peak	Pass
2310.000	35.41	-10.95	24.46	54.00	-29.54	AV	Pass
2390.000	52.62	-10.86	41.76	74.00	-32.24	peak	Pass
2390.000	38.38	-10.86	27.52	54.00	-26.48	AV	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2310.000	45.35	-10.95	34.40	74.00	-39.60	peak	Pass
2310.000	36.64	-10.95	25.69	54.00	-28.31	AV	Pass
2390.000	56.20	-10.86	45.34	74.00	-28.66	peak	Pass
2390.000	37.63	-10.86	26.77	54.00	-27.23	AV	Pass
Test Channel: Highest channel, Test Polarization: Vertical							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.500	44.43	-10.34	34.09	74.00	-39.91	peak	Pass
2483.500	36.43	-10.34	26.09	54.00	-27.91	AV	Pass
2500.000	46.42	-10.24	36.18	74.00	-37.82	peak	Pass
2500.000	36.95	-10.24	26.71	54.00	-27.29	AV	Pass
Test Channel: Highest channel, Test Polarization: Horizontal							
Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
2483.500	49.75	-10.34	39.41	74.00	-34.59	peak	Pass
2483.500	40.52	-10.34	30.18	54.00	-23.82	AV	Pass
2500.000	44.97	-10.24	34.73	74.00	-39.27	peak	Pass
2500.000	35.19	-10.24	24.95	54.00	-29.05	AV	Pass

A8.AC Power-Line Conducted Emission

Note:

- 1.All modes have been tested, only worst case(3DH5_2402MHz)mode was recorded in the test report.
- 2.Emission Level (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. The emission levels of other frequencies were less than 20dB margin against the limit.
5. Margin value = Emission level-Limit value.





*****END*****