



SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

EMC-ARF-05 Rev 1.1

Page: 1 of 26

FCC ID: PX8CFNG-MRU

Appendix -

Test Data and Result for report

GZCR241100135103

(For FirstNet Band DL)



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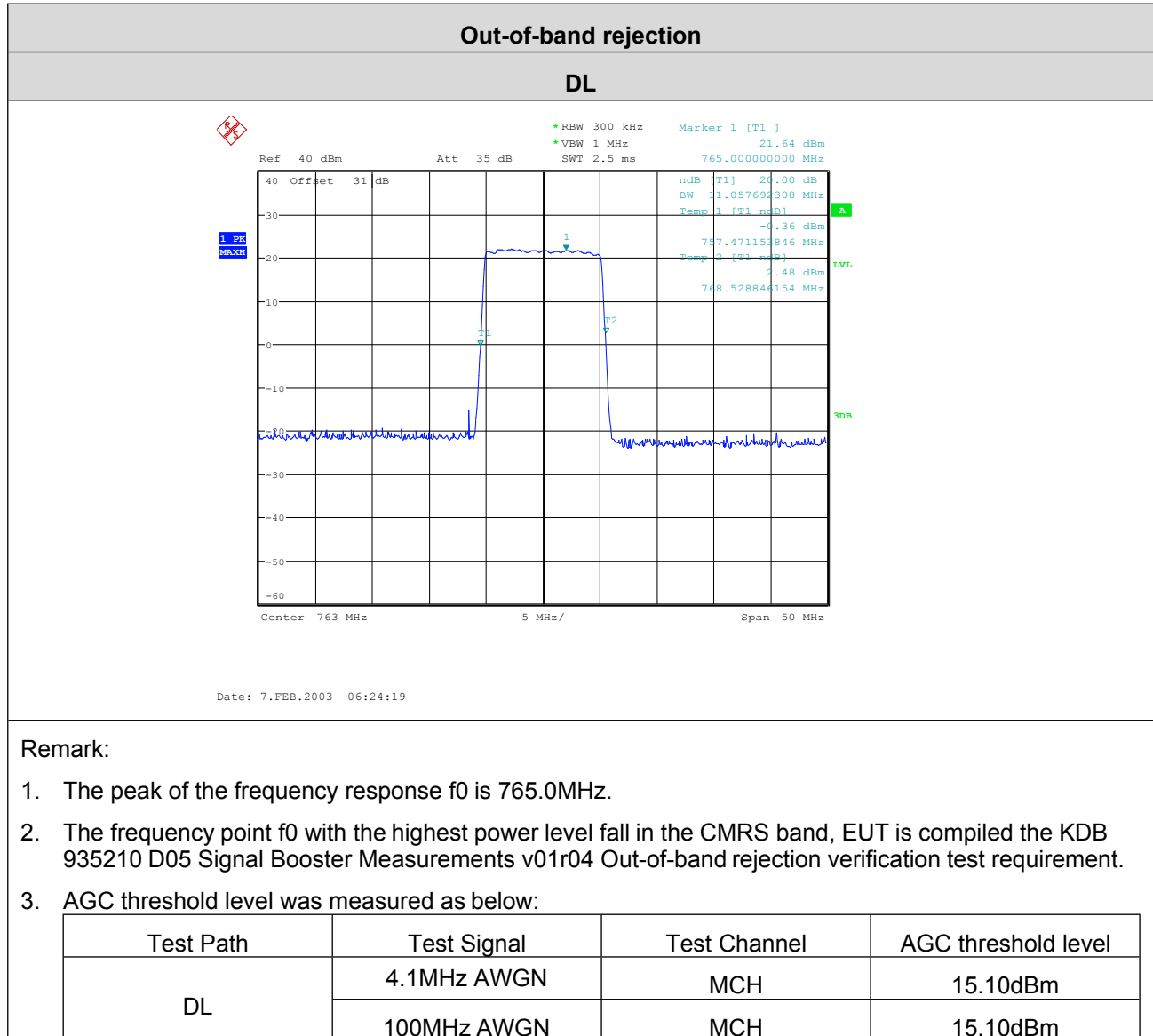
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Guangzhou Branch Testing Laboratory

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1 Out-of-band rejection



2 Input versus Output comparison

Occupied Bandwidth				
Test Path	Test Signal	Test Channel	Signal Level	Verdict
DL	4.1MHz AWGN	MCH	Pre-AGC	PASS
			3dB above AGC	PASS
	100MHz AWGN	MCH	Pre-AGC	PASS*
			3dB above AGC	PASS*

Remark:

- * The band supports maximum channel BW is 10MHz for NR, so the output signal OBW was less than the input when 100MHz AWGN was as stimulus signal.
- Compare the spectral plot of the input signal to the output signal affirm that they are similar (in passband and roll off characteristic features and relative spectral locations). The test result complies with the requirement.

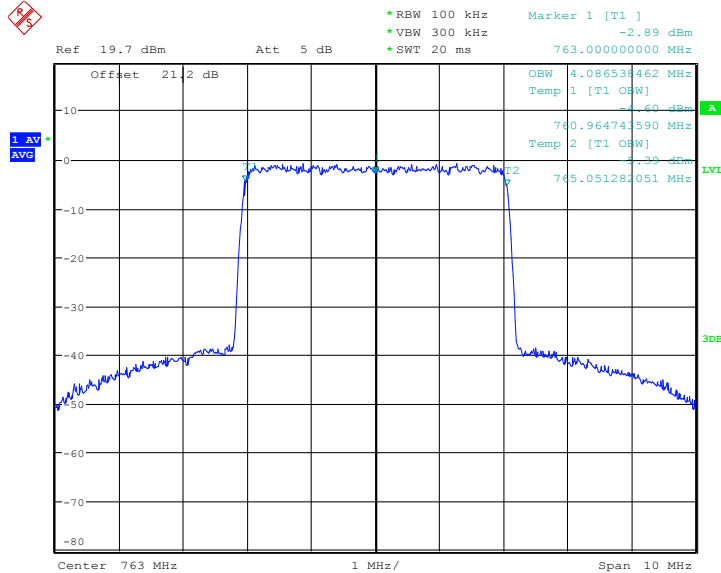


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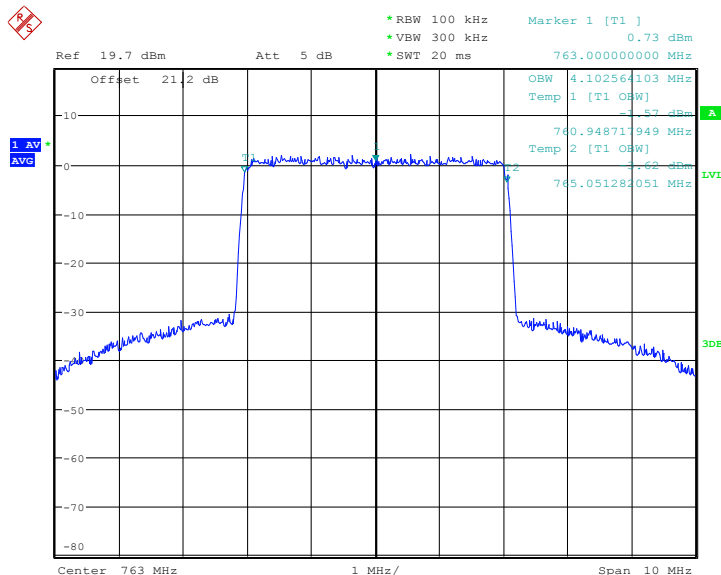
99% OBW

DL_4.1MHz AWGN_MCH_Input_Pre-AGC



Date: 19.NOV.2024 12:32:59

DL_4.1MHz AWGN_MCH_Input_3dB above AGC



Date: 19.NOV.2024 12:33:07



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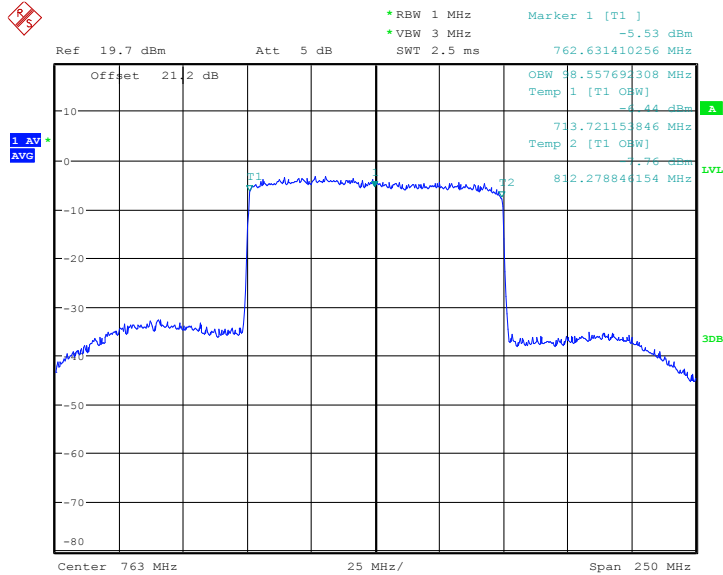
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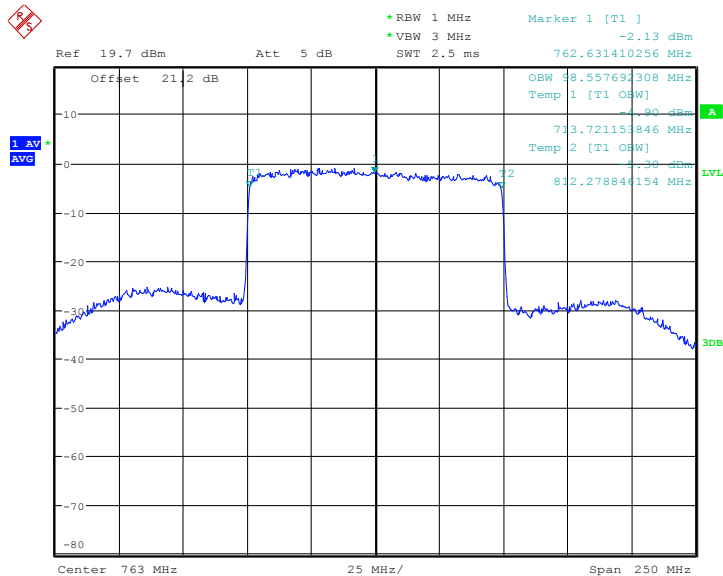
99% OBW

DL_100MHz AWGN_MCH_Input_Pre-AGC



Date: 19.NOV.2024 12:28:17

DL_100MHz AWGN_MCH_Input_3dB above AGC



Date: 19.NOV.2024 12:28:33



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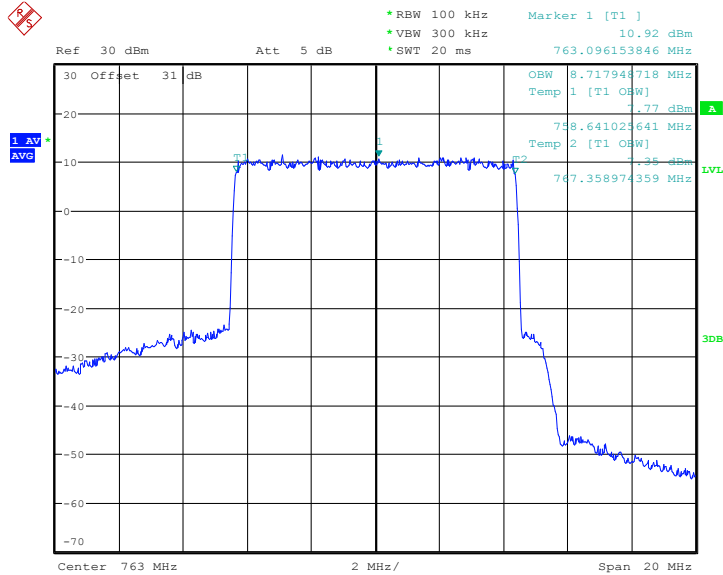
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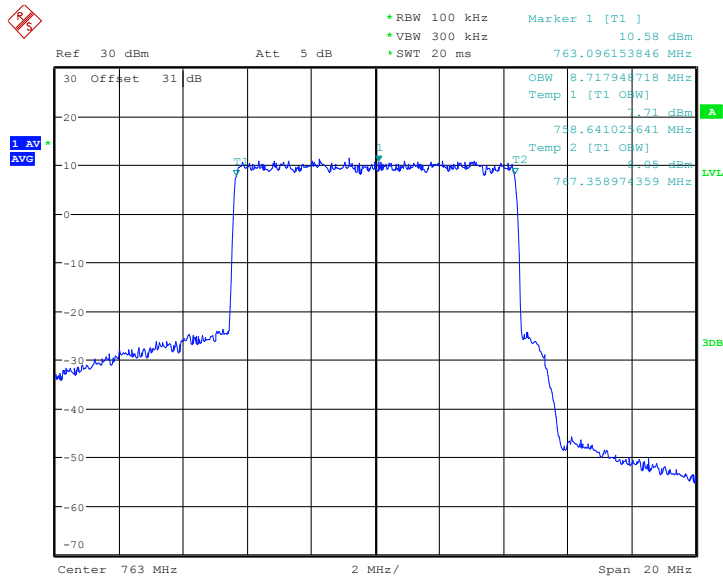
99% OBW

DL_100MHz AWGN_MCH_Output_Pre-AGC



Date: 15.NOV.2024 08:40:34

DL_100MHz AWGN_MCH_Output_3dB above AGC



Date: 15.NOV.2024 08:40:45



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3 Emission Mask

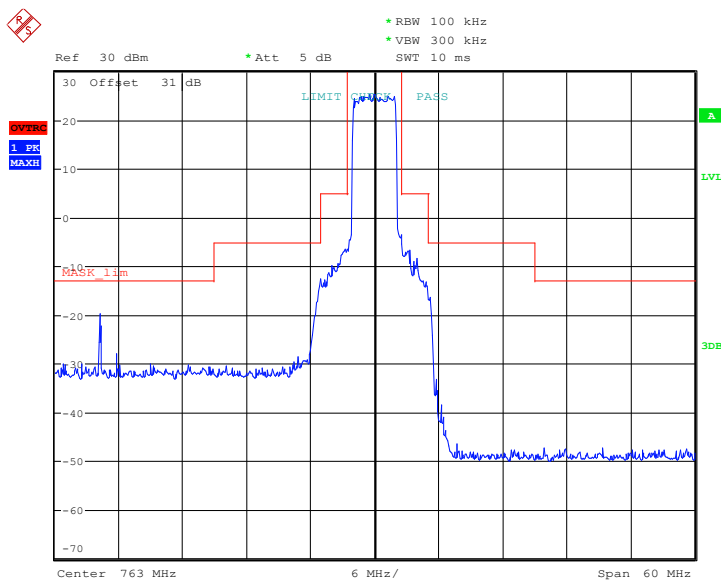
Emission Masks					
Test path	Test signal	Test channel	Signal level	Emission mask	Verdict
DL	4.1MHz AWGN	MCH	Pre-AGC	Mask B	PASS
			3dB above AGC		PASS
	100MHz AWGN	MCH	Pre-AGC	Mask B	PASS*
			3dB above AGC		PASS*

Remark:

* The band supports maximum channel BW is 10MHz for NR, so the output signal OBW was less than the input when 100MHz AWGN was as stimulus signal.

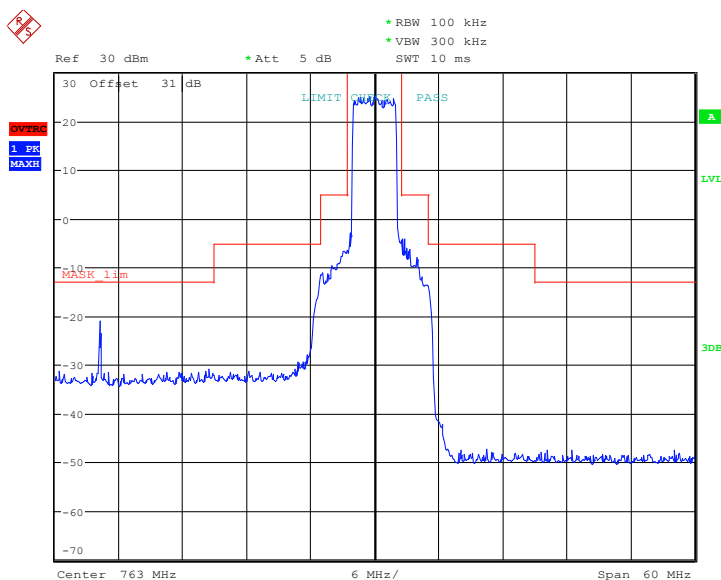
Emission Mask B

DL_4.1MHz AWGN_MCH_Output_Pre-AGC



Date: 15.NOV.2024 09:52:06

DL_4.1MHz AWGN_MCH_Output_3dB above AGC



Date: 15.NOV.2024 09:53:58



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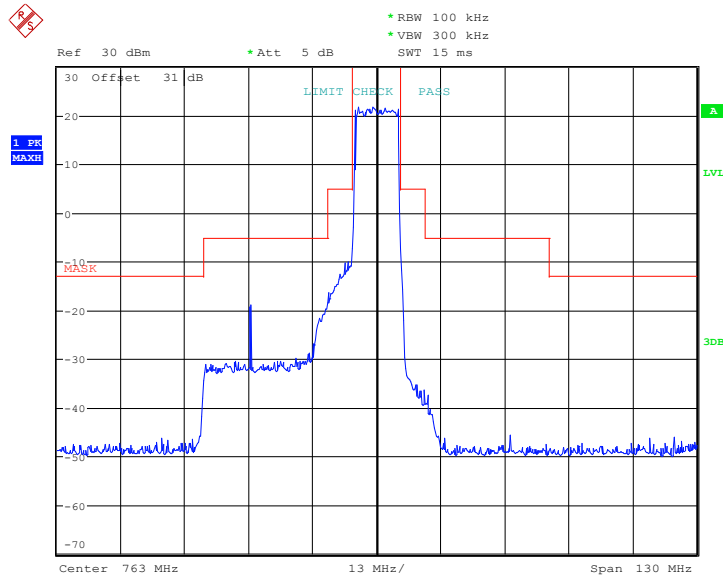
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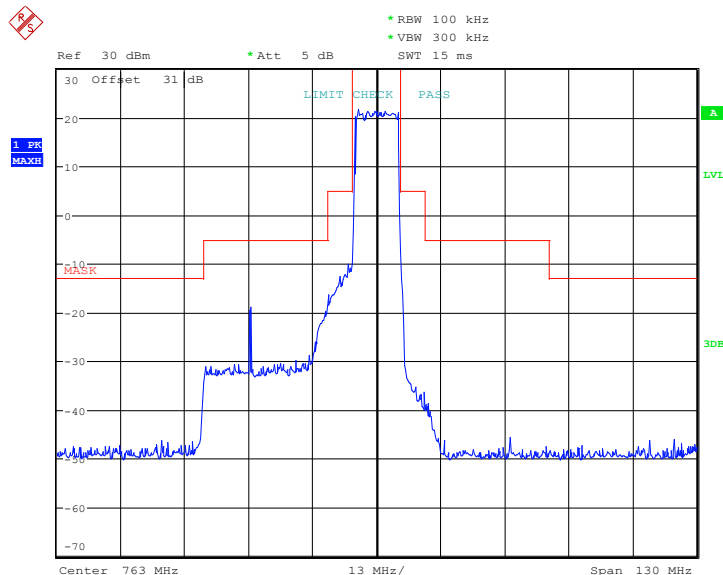
Emission Mask B

DL_100MHz AWGN_MCH_Output_Pre-AGC



Date: 15.NOV.2024 09:46:13

DL_100MHz AWGN_MCH_Output_3dB above AGC



Date: 15.NOV.2024 09:45:54



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4 Input/output power and amplifier/booster gain

Mean output power and gain								
Test Path	Test Freq. f0 (MHz)	Test Signal	Signal Level	Input power (dBm)	Output Power (dBm)	ERP (dBm)	ERP (W)	Gain (dB)
DL	765.0	4.1MHz AWGN	Pre-AGC	15	29.65	32.50	1.78	14.65
			3dB above AGC	18	30.11	32.96	1.98	/
		100MHz AWGN	Pre-AGC	15	29.32	32.17	1.65	14.32
			3dB above AGC	18	29.86	32.71	1.87	/
Remark: 1. f0 is from Out-of-band Rejection test in the report. 2. ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the antenna gain is 5dBi declared by the manufacturer.								

Mean output power							
Test Path	Test Freq. f0 (MHz)	Test Signal	Signal Level	Output Power (dBm/MHz)	ERP (dBm/MHz)	ERP (W/MHz)	Verdict
DL	765.0	4.1MHz AWGN	Pre-AGC	23.53	26.38	0.44	PASS
			3dB above AGC	23.99	26.84	0.49	PASS
		100MHz AWGN	Pre-AGC	19.79	22.64	0.19	PASS
			3dB above AGC	20.33	23.18	0.21	PASS
Remark: 1. f0 is from Out-of-band Rejection test in the report. 2. ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the antenna gain is 5dBi declared by the manufacturer. 3. The output power is limited to an EIRP of 1000W/MHz.							



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Page: 12 of 26

5 Noise Figure

Noise Figure			
Test Path	Maximum Noise Figure (dB)	Limit (dB)	Verdict
DL	7.78	≤9	PASS



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6 Intermodulation emissions

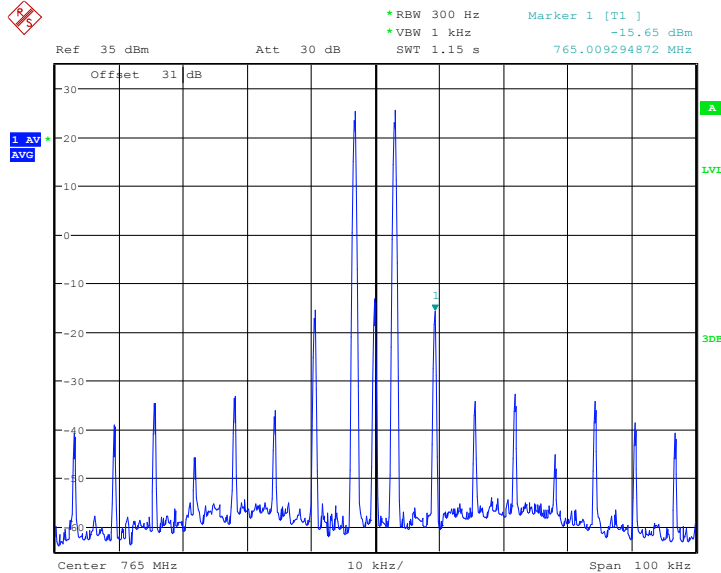
Intermodulation emissions					
Test Path	Test Freq. f0 (MHz)	CW signals spacing (kHz)	Signal Level	Worst conducted test level (dBm)	
				/300Hz	/10kHz
DL	765.0	6.25	Pre-AGC	-15.65	-0.42
			3dB above AGC	-15.11	0.12
		12.5	Pre-AGC	-19.57	-4.34
			3dB above AGC	-18.44	-3.21
		25	Pre-AGC	-14.67	0.56
			3dB above AGC	-13.41	1.82

Remark:

- f0 is from Out-of-band Rejection test in the report.
- The level in 10kHz measurement bandwidth= the level in 300Hz measurement bandwidth+ 10lg(10000/300).
- ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the maximum antenna gain is 5dBi declared by the manufacturer.
- The maximum ERP of intermodulation product is 1.82dBm/10kHz+ 5- 2.15= 4.67dBm/10kHz, which exceeded the limit -30dBm/10kHz, the applicant must use good engineering practice to eliminate the intermodulation products interference.

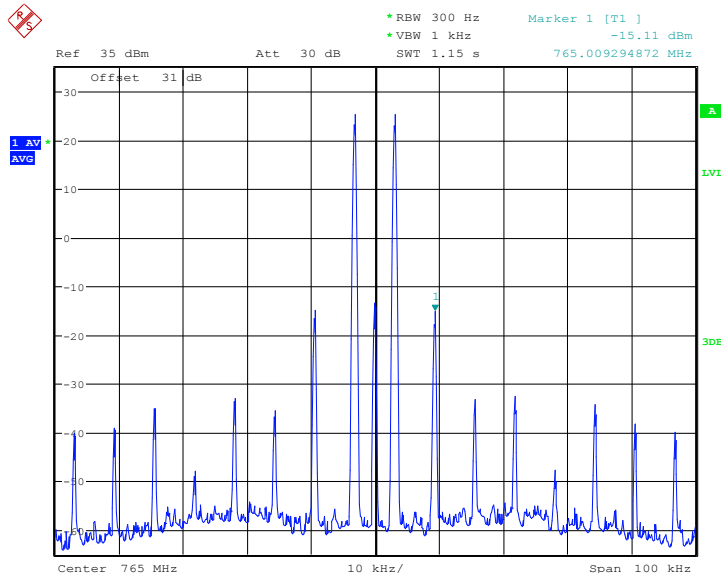
Intermodulation emissions

DL_6.25kHz spacing_Pre-AGC



Date: 15.NOV.2024 09:00:03

DL_6.25kHz spacing_3dB above AGC



Date: 15.NOV.2024 09:00:22

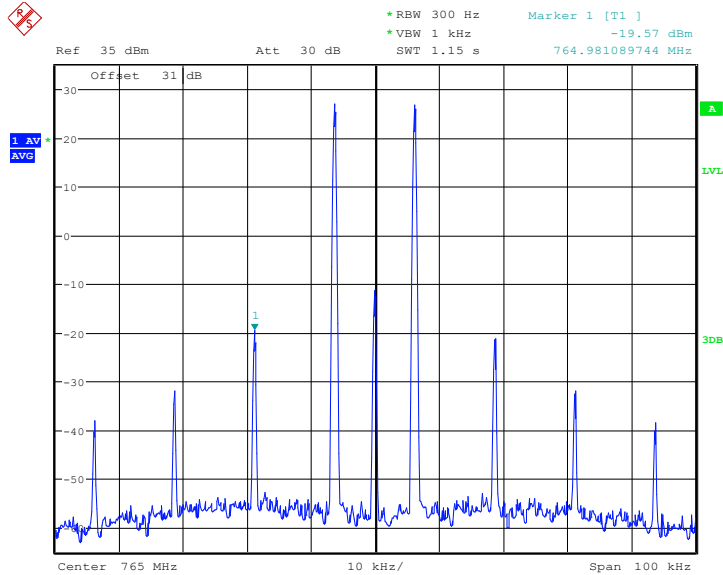


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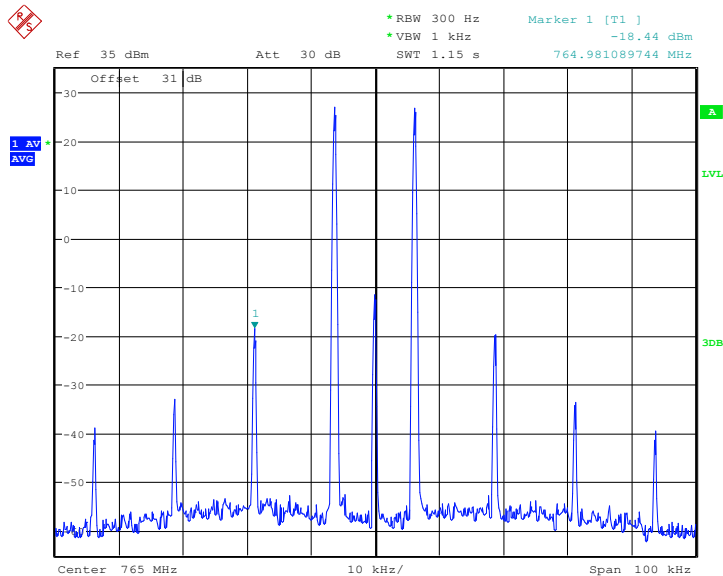
Intermodulation emissions

DL_12.5kHz spacing_Pre-AGC



Date: 15.NOV.2024 09:01:07

DL_12.5kHz spacing_3dB above AGC



Date: 15.NOV.2024 09:01:18



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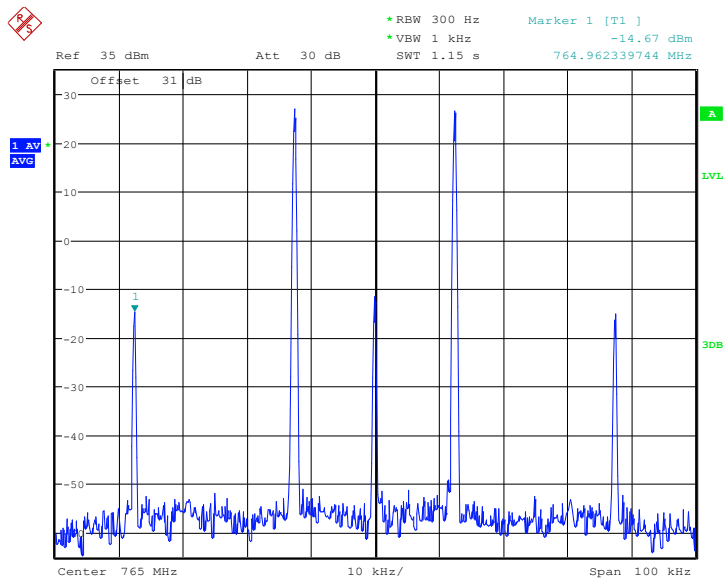
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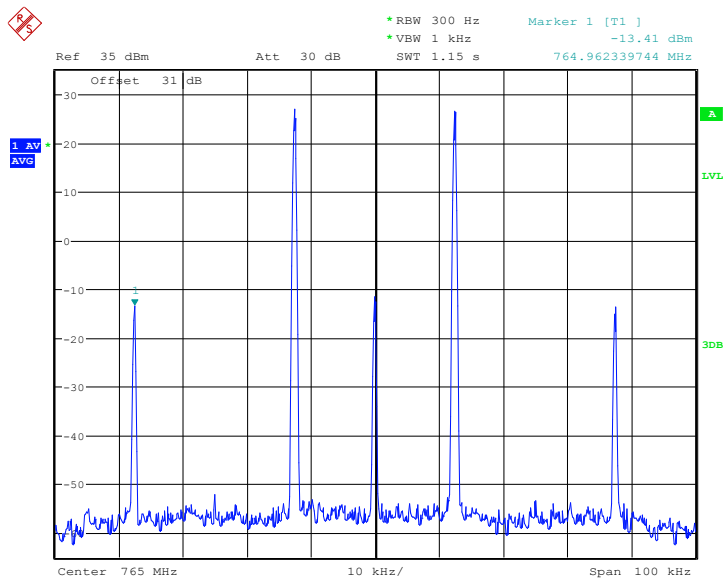
Intermodulation emissions

DL_25kHz spacing_Pre-AGC



Date: 15.NOV.2024 09:01:47

DL_25kHz spacing_3dB above AGC



Date: 15.NOV.2024 09:02:01



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7 Conducted Spurious emissions

Conducted Spurious emissions						
Test path	Test signal	Test channel	Frequency range (MHz)	Worst test level (dBm)	Limit (dBm)	Verdict
DL	4.1MHz AWGN	LCH	0.09-758	-19.33	≤-13	PASS
		HCH	768-1000	-27.97	≤-13	PASS
			1000-7680	-16.06	≤-13	PASS
			769-775	-55.87	≤-46	PASS
			799-805	-56.21	≤-46	PASS
Remark: 1. On all frequencies between 769-775MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations, here P= 30dBm= 1W Limit= 30dBm- [76 + 10 log ₁₀ (1W)]dB= -46dBm 2. The conducted spurious emissions 769MHz to 775MHz and 799MHz to 805MHz were very low and not displayed test plots in this report. 3. All modes (LCH/MCH/HCH, with 4.1MHz AWGN signal/ with 100MHz AWGN signal) had been tested, only show the worst-case in this report.						

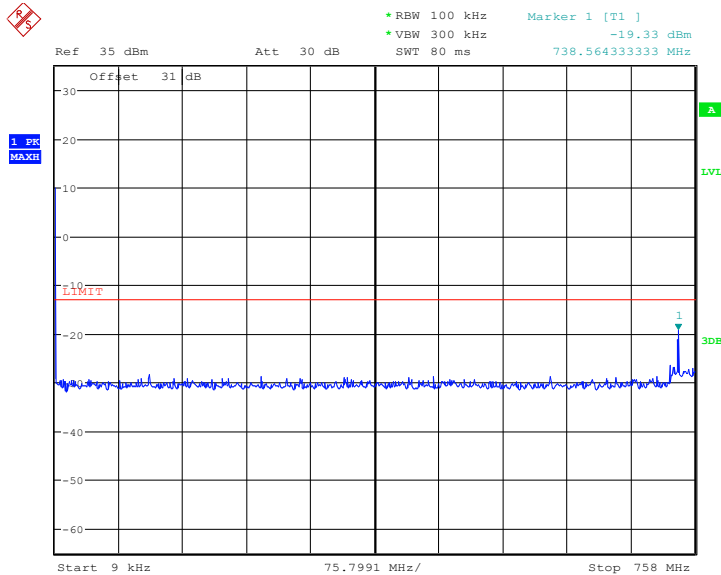


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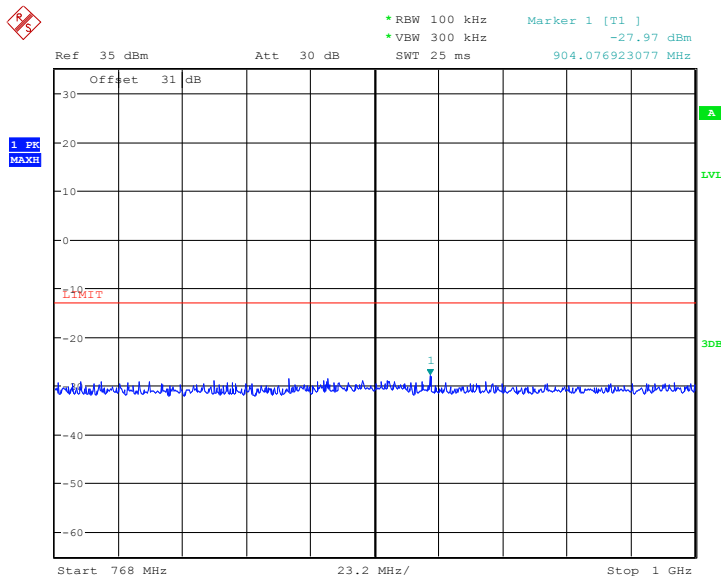
Conducted spurious emissions

DL_4.1MHz AWGN_LCH_Pre-AGC



Date: 15.NOV.2024 09:04:19

DL_4.1MHz AWGN_HCH_Pre-AGC



Date: 15.NOV.2024 09:04:41

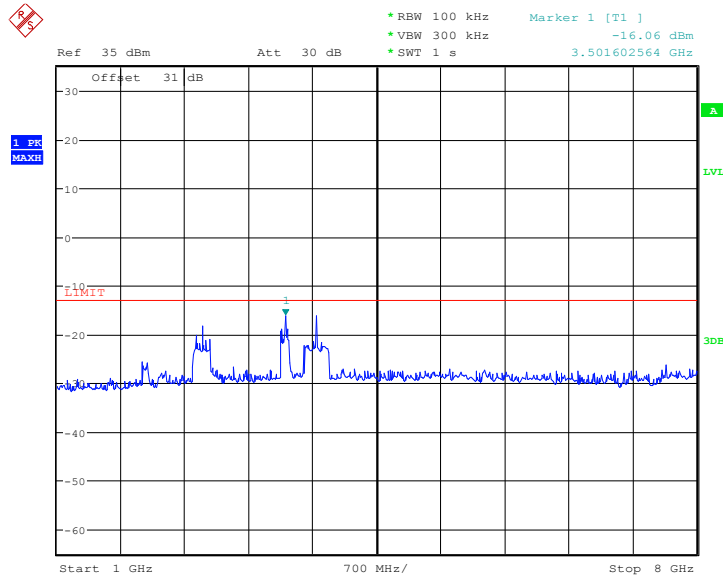


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Conducted spurious emissions

DL_4.1MHz AWGN_HCH_Pre-AGC



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Guangzhou Branch Testing Laboratory

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8 Noise

Noise within the passband		
Test path	Frequency range (MHz)	Worst conducted test level (dBm)
DL	758-768	-47.22
Noise outside of the passband		
Test path	Frequency range (MHz)	Worst conducted test level (dBm)
DL	0.009-757	-31.58
	769-7680	-31.17

Remark:

1. ERP= conducted test level (dBm)+ antenna gain (dBi)- 2.15dB, the maximum antenna gain is 5dBi declared by the manufacturer.
2. The ERP of worst noise within the passband is -47.22/10kHz+ 5dBi- 2.15dB= -44.37dBm, which complies the limit -43dBm in 10kHz measurement bandwidth.
3. The ERP of worst noise outside of the passband is -31.17/10kHz+ 5dBi- 2.15dB= -28.32dBm, the applicant must use good engineering practice to make sure that the ERP of noise outside the passband should not exceed -70dBm in 10kHz measurement bandwidth.



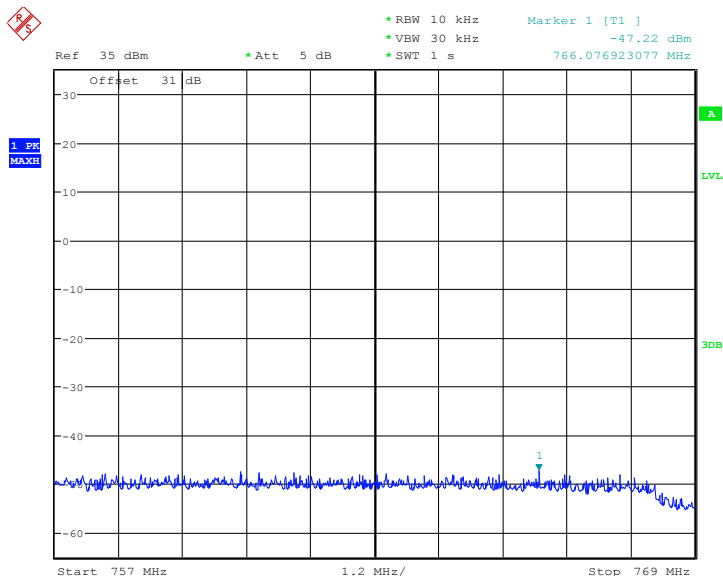
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EMC-ARF-05 Rev 1.1

Page: 21 of 26

Noise_ Within the passband

DL



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Guangzhou Branch, Testing Services Co., Ltd. EMC Laboratory

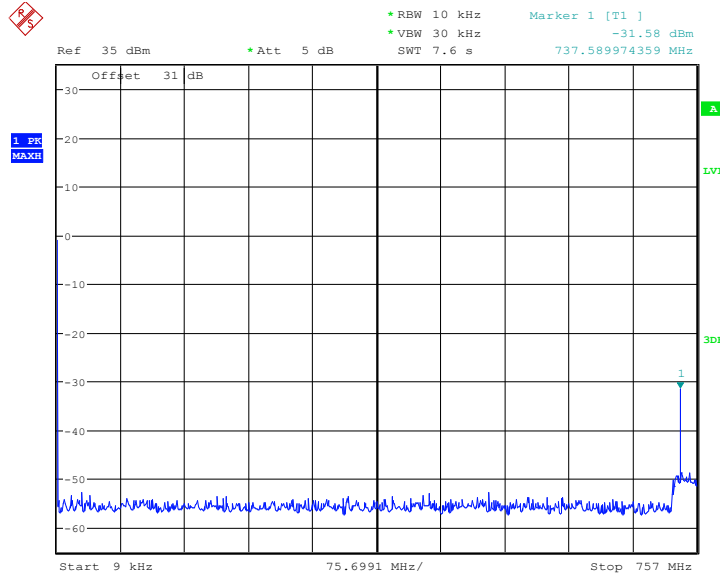
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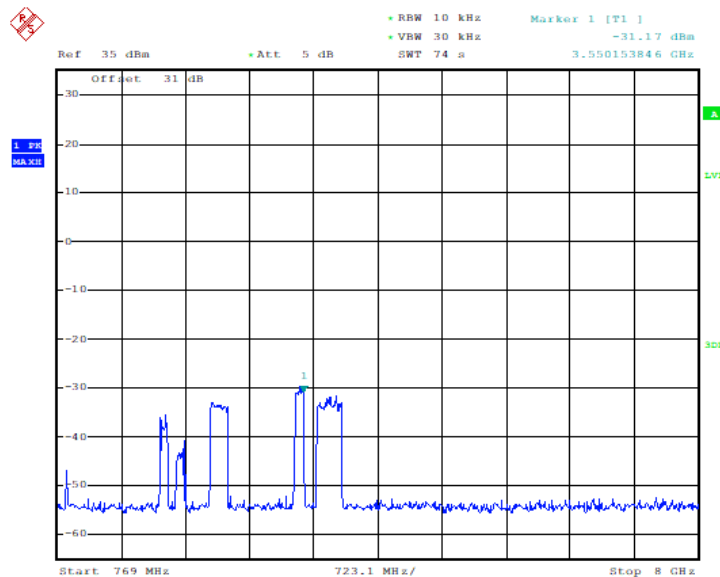
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Noise_Out of the passband

DL



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Date: 15.NOV.2024 09:15:36



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9 Frequency Stability

Frequency stability vs voltage							
Test path	Test Channel	Test Signal	Temperature	Voltage	Freq. error (Hz)	Tolerance (ppm)	Verdict
DL	MCH	4.1MHz	TN	VL	14.2	0.01861	PASS
		AWGN	TN	VH	10.7	0.01402	PASS
		100MHz	TN	VL	13.8	0.01809	PASS
		AWGN	TN	VH	13.9	0.01822	PASS



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Frequency stability vs temperature							
Test Path	Test Channel	Test Signal	Voltage	Temperature (°C)	Freq. error (Hz)	Tolerance (ppm)	Verdict
DL	MCH	4.1MHz AWGN	VN	+50	7.4	0.00970	PASS
			VN	+40	8.0	0.01048	PASS
			VN	+30	11.3	0.01481	PASS
			VN	+20	13.7	0.01796	PASS
			VN	+10	12.4	0.01625	PASS
			VN	0	8.8	0.01153	PASS
			VN	-10	14.2	0.01861	PASS
			VN	-20	10.8	0.01415	PASS
			VN	-30	12.2	0.01599	PASS
	MCH	100MHz AWGN	VN	+50	9.3	0.01219	PASS
			VN	+40	15.3	0.02005	PASS
			VN	+30	16.1	0.02110	PASS
			VN	+20	12.7	0.01664	PASS
			VN	+10	8.4	0.01101	PASS
			VN	0	11.7	0.01533	PASS
			VN	-10	14.8	0.01940	PASS
			VN	-20	11.5	0.01507	PASS
			VN	-30	8.0	0.01048	PASS



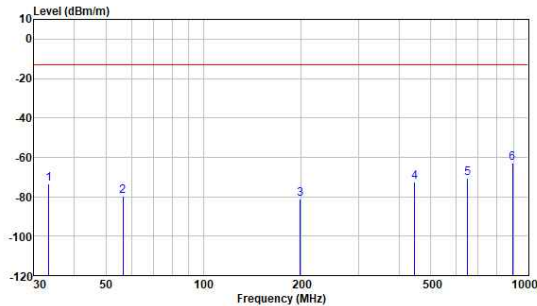
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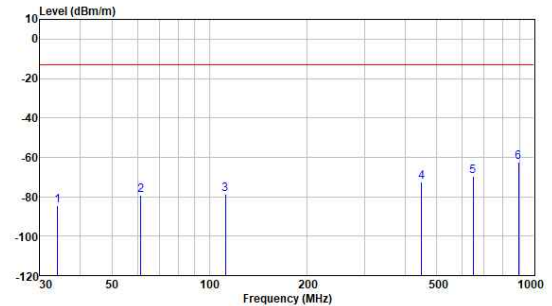
10 Radiated Spurious emissions

Radiated Spurious emissions

DL_4.1MHz AWGN_MCH_30MHz-1GHz

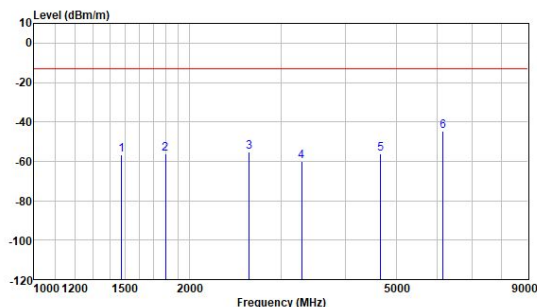


	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	33.33	-76.48	3.04	-73.44	-13.00	-60.44	HORIZONTAL
2	56.39	-77.44	-2.18	-79.62	-13.00	-66.62	HORIZONTAL
3	198.59	-74.31	-6.70	-81.01	-13.00	-68.01	HORIZONTAL
4	446.41	-72.77	0.24	-72.53	-13.00	-59.53	HORIZONTAL
5	649.66	-74.24	3.79	-70.45	-13.00	-57.45	HORIZONTAL
6	893.86	-72.00	9.15	-62.85	-13.00	-49.85	HORIZONTAL

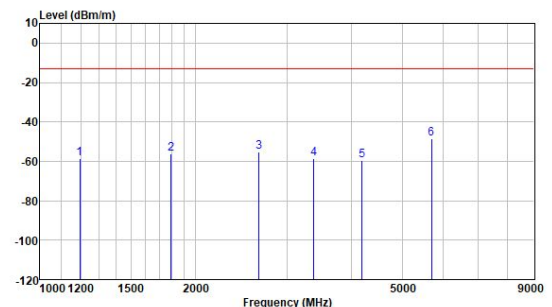


	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	34.04	-76.98	-7.59	-84.57	-13.00	-71.57	VERTICAL
2	61.35	-76.45	-2.67	-79.12	-13.00	-66.12	VERTICAL
3	111.74	-74.67	-4.31	-78.98	-13.00	-65.98	VERTICAL
4	449.56	-73.96	1.48	-72.48	-13.00	-59.48	VERTICAL
5	647.39	-74.24	4.70	-69.54	-13.00	-56.54	VERTICAL
6	893.86	-72.70	10.26	-62.44	-13.00	-49.44	VERTICAL

DL_4.1MHz AWGN_MCH_above 1GHz



	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1475.37	-61.42	4.70	-56.72	-13.00	-43.72	HORIZONTAL
2	1794.03	-62.02	5.68	-56.34	-13.00	-43.34	HORIZONTAL
3	2600.73	-60.77	5.74	-55.03	-13.00	-42.03	HORIZONTAL
4	3290.03	-62.24	2.22	-60.02	-13.00	-47.02	HORIZONTAL
5	4665.78	-63.68	7.59	-56.09	-13.00	-43.09	HORIZONTAL
6	6154.02	-63.75	19.07	-44.68	-13.00	-31.68	HORIZONTAL



	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1194.00	-61.58	3.01	-58.57	-13.00	-45.57	VERTICAL
2	1790.09	-61.95	5.75	-56.20	-13.00	-43.20	VERTICAL
3	2646.85	-60.70	5.42	-55.28	-13.00	-42.28	VERTICAL
4	3377.93	-61.62	3.07	-58.55	-13.00	-45.55	VERTICAL
5	4189.54	-63.55	4.16	-59.39	-13.00	-46.39	VERTICAL
6	5698.49	-64.02	15.66	-48.36	-13.00	-35.36	VERTICAL

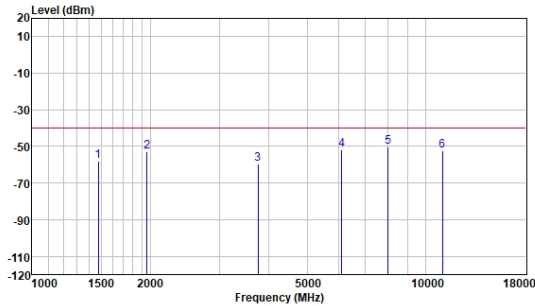


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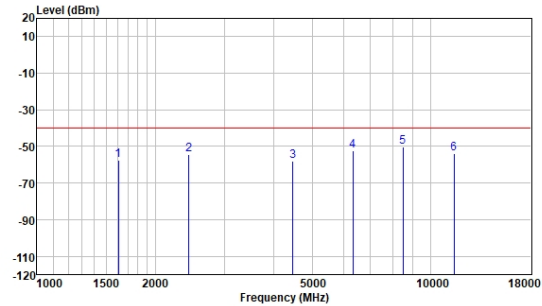
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Radiated Spurious emissions

DL_4.1MHz AWGN_MCH_1559MHz-1610MHz



Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
MHz	dBm	dB	dBm	dBm	dB	
1	1473.01	-62.48	4.70	-57.78	-40.00	-17.78
2	1961.00	-61.70	8.64	-53.06	-40.00	-13.06
3	3746.79	-62.98	3.48	-59.50	-40.00	-19.50
4	6124.29	-71.02	19.10	-51.92	-40.00	-11.92
5	8013.02	-63.87	13.75	-50.12	-40.00	-10.12
6	11012.25	-76.64	24.09	-52.55	-40.00	-12.55



Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
MHz	dBm	dB	dBm	dBm	dB	
1	1611.09	-62.54	4.88	-57.66	-40.00	-17.66
2	2428.67	-63.63	9.21	-54.42	-40.00	-14.42
3	4469.21	-63.51	5.51	-58.00	-40.00	-18.00
4	6340.44	-71.80	19.24	-52.56	-40.00	-12.56
5	8489.88	-64.26	14.18	-50.08	-40.00	-10.08
6	11467.00	-75.94	22.17	-53.77	-40.00	-13.77

Remark:

Pre-test was performed for all modes (LCH/MCH/HCH, with 4.1MHz AWGN signals/ with 100MHz AWGN signals), the test result always keeps more than 20dB margin, the spurious emissions 9kHz to 30MHz were very low and not displayed in this report. Therefore, only show the worst-case in this report.

--End of Appendix--

