

Test result and instruments about Type certificate

1. General

Model name	WFM200SA, WFM200SN	Date	28.-29.9.2019
Serial number		Place	SGS Fimko Ltd, Karakaarenkuja 4, FI-02610 Espoo
Class of emissions, Assigned frequency and Antenna power	G1D, 2412-2472 MHz, 0.0025 W/MHz	Remarks	11b, tested with 1 Mbps, Antenna Port 2

2. Measuring Instruments

Equipment type	Model number	Serial number	Manufacturer	Calibrated Date	Calibration Authority	Remarks
Signal Analyzer	FSV40	101838	Rohde & Schwarz	07 February 2019	Rohde & Schwarz (c)	SGS Inv. 10881
Cable	EM40-3131-59	11,153,209,001	Megaphase	-	-	SGS Inv. C118
Attenuator	10 dB, DC-40 GHz	A2	Inmet	1 April 2019	SGS (c)	SGS Inv. 10347
Multimeter	21	40790690	Fluke	29 October 2018	SGS (c)	SGS Inv. 8253

3. Test Result

Condition	Test Items	Unit	Normal Voltage -9.1% (3.00 V)			Normal Voltage (3.30 V)			Normal Voltage +9.1% (3.60 V)			Judgment	Limit	Remarks	
			2412	2442	2472	2412	2442	2472	2412	2442	2472				
Normal (23 °C, 41-58 %)	Frequency	MHz	2411.989	2441.988	2471.979	2411.988	2441.987	2471.99	2411.986	2441.985	2471.986	Pass	±50ppm		
		ppm	-4.61	-4.84	-8.70	-5.11	-5.29	-5.32	-5.79	-5.95	-5.73				
	Occupied Bandwidth	MHz	12.7136432	12.6836582	12.6536732	12.7136432	12.8035982	12.6536732	12.5637181	12.6236882	12.5037481	Pass	26MHz		
	Spread Bandwidth	MHz	8.12593703	8.12593703	8.09595202	8.12593703	8.15592204	8.09595202	8.06596702	8.09595202	8.06596702	Pass	500kHz		
	Spread Rate		8.12593703	8.12593703	8.09595202	8.12593703	8.15592204	8.09595202	8.06596702	8.09595202	8.06596702	Pass	5		
	Spurious Emissions	30MHz-2387MHz	dBm	-45.78	-45.70	-46.20	-44.90	-44.82	-45.67	-45.82	-45.76	-45.56	Pass	-26dBm	
			MHz	2382.912	2383.649	263.446	2386.742	2386.006	446.403	248.715	232.659	313.678			
		2387MHz-2400MHz	dBm	-32.86	-54.12	-55.57	-31.55	-53.83	-55.94	-37.59	-54.07	-55.84	Pass	-16dBm	
			MHz	2400.000	2399.711	2389.180	2400.000	2399.269	2394.329	2399.149	2399.943	2397.369			
		2483.5MHz-2496.5MHz	dBm	-55.65	-54.49	-35.22	-56.01	-54.20	-31.56	-56.47	-53.95	-38.35	Pass	-16dBm	
			MHz	2487.019	2483.500	2483.500	2485.050	2483.814	2483.500	2484.629	2485.552	2484.961			
		2496.5MHz-12.5GHz	dBm	-44.04	-47.22	-47.13	-41.95	-47.50	-45.81	-35.90	-46.20	-45.44	Pass	-26dBm	
			MHz	4823.340	4884.290	4944.310	4824.270	4883.980	4944.000	4823.960	4883.980	4944.310			
	Antenna Power		W/MHz	0.00084528	0.00101625	0.00133968	0.00131826	0.00145881	0.00203236	0.00124165	0.00279898	0.00178649	Pass	0.01W/MHz	
			%	-66.188846	-59.350052	-46.412933	-47.26973	-41.64743	-18.70572	-50.333908	11.9592528	-28.540497		+20 ~ -80%	
	Secondary Radiated Emissions	30MHz-1GHz	dBm	-66.76	-76.04	-74.19	-65.26	-76.35	-74.65	-66.92	-76.63	-74.12	Pass	-54dBm	
			MHz	951.517	952.335	969.613	857.005	968.976	646.401	969.128	968.249	969.613			
1GHz-12.5GHz		dBm	-59.63	-58.99	-58.68	-59.18	-59.37	-58.86	-59.31	-59.37	-58.95	Pass	-47dBm		
		MHz	12448.070	12279.170	12483.650	12444.840	11285.89	12437.290	12456.340	12479.340	11297.030				
Interference Prevention Function			Function was checked by obtaining MAC address of the EUT: 08:6b:d7:d6:f8:2d									Pass			

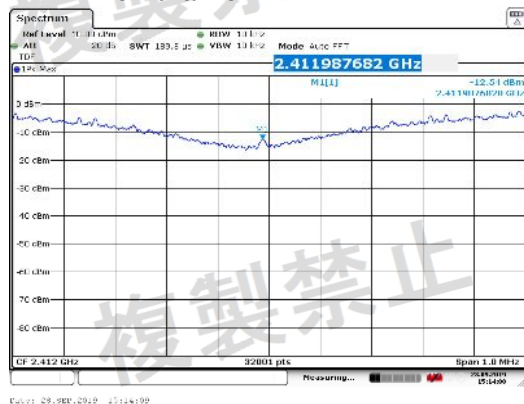
Note:

The final product does not support operation with ±10% of the nominal 3.30 V voltage, so the equipment was tested with its supported extreme voltages 3.00 and 3.60 V.

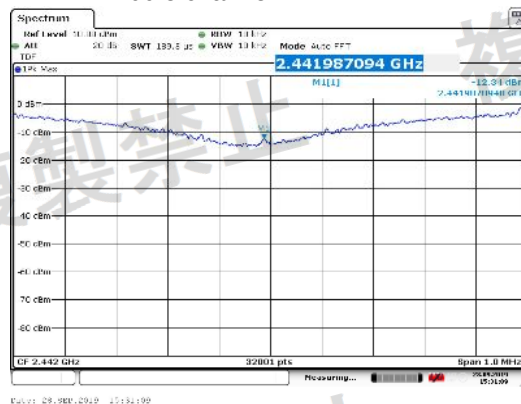
Screen Shot at normal voltage

Frequency

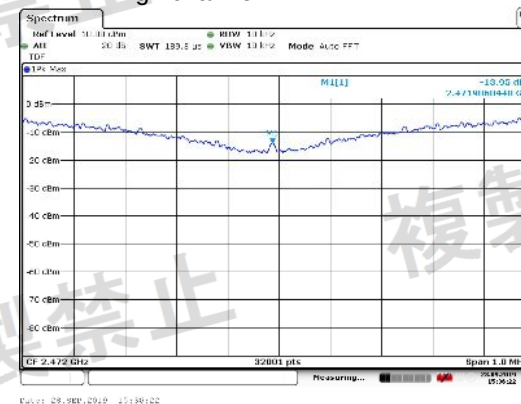
Low channel



Middle channel

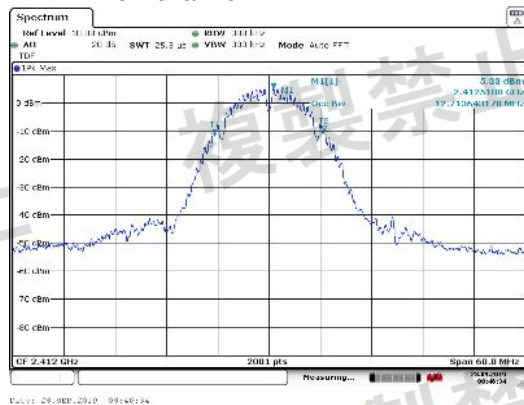


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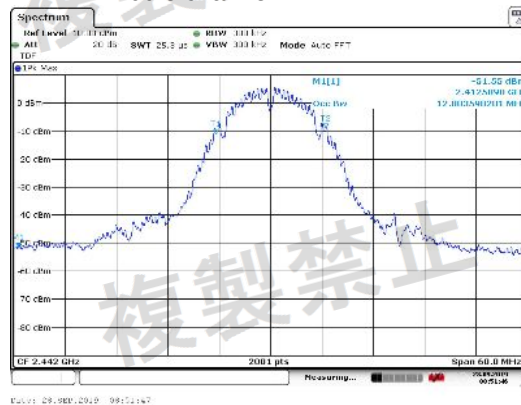


Occupied Bandwidth

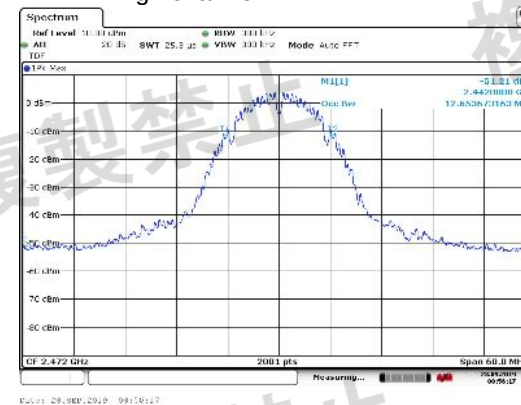
Low channel



Middle channel

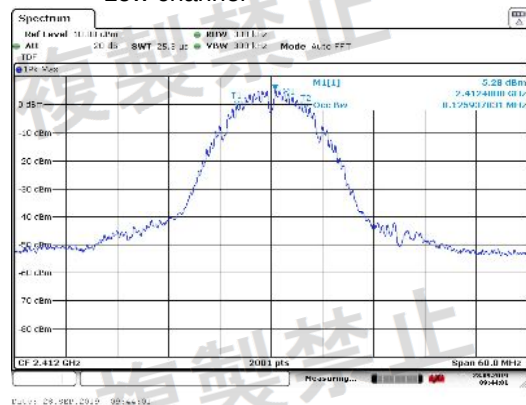


High channel

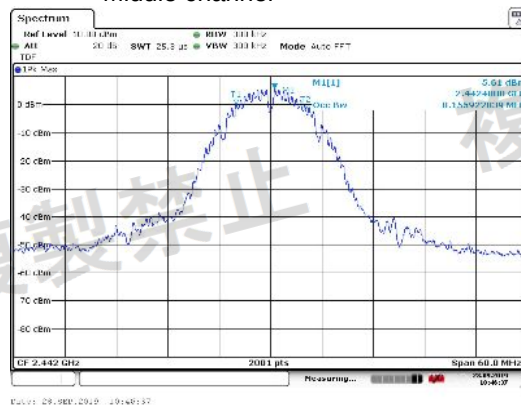


Spread Bandwidth

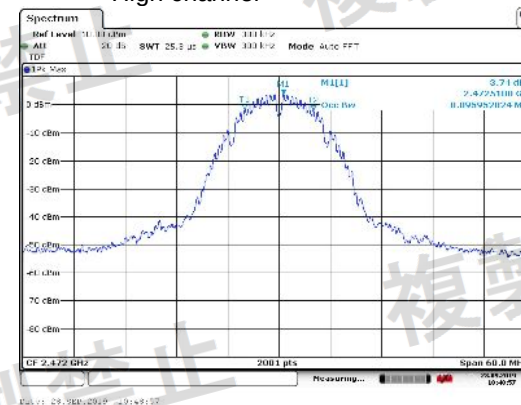
Low channel



Middle channel

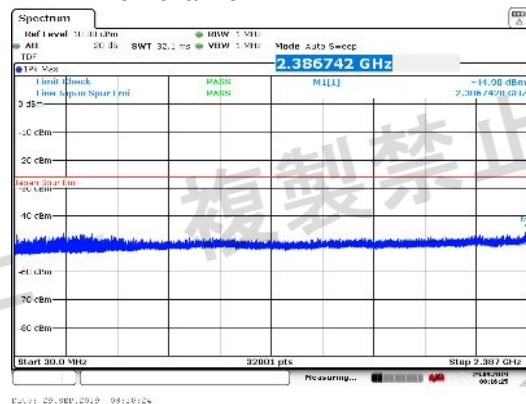


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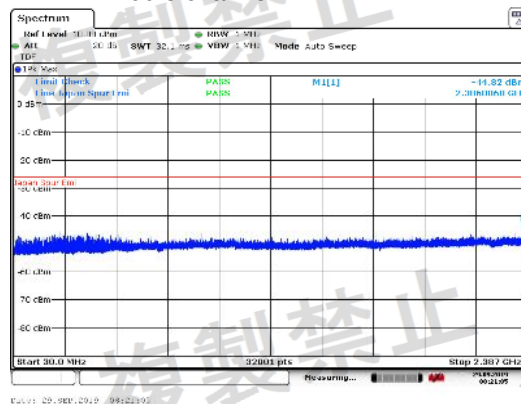


Spurious Emission Intensity

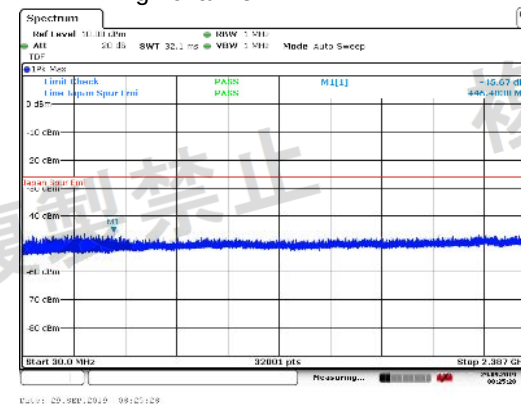
Low channel

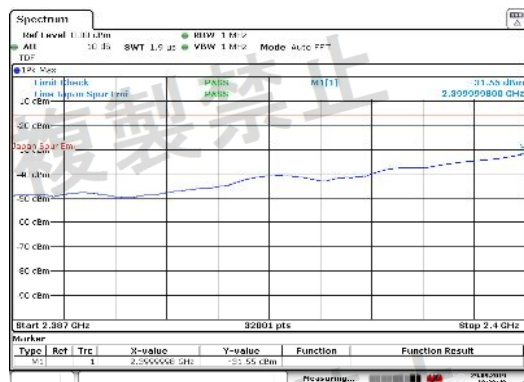


Middle channel

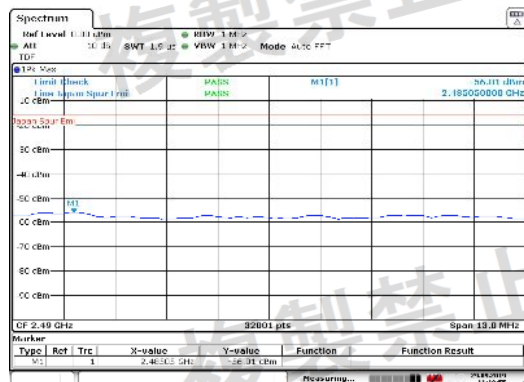


High channel

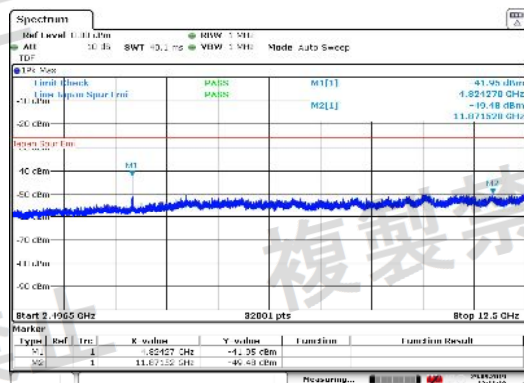




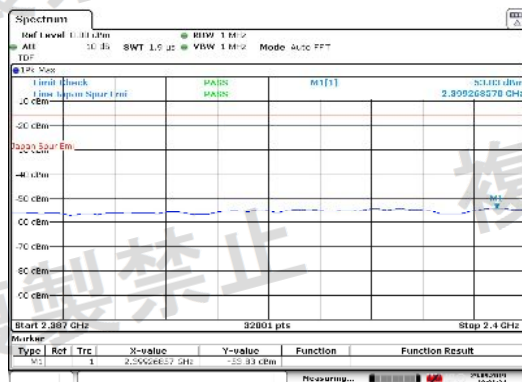
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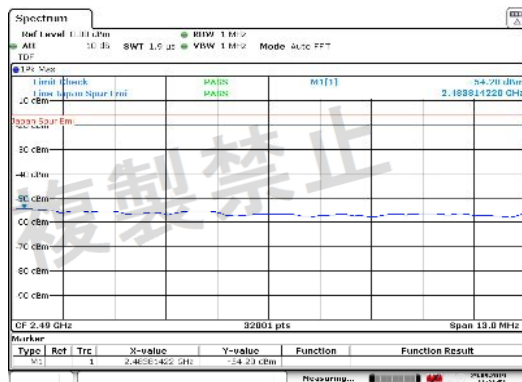
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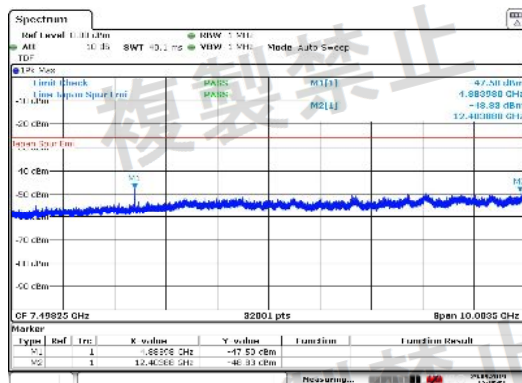
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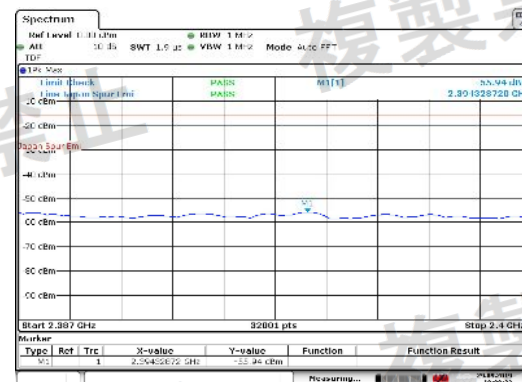
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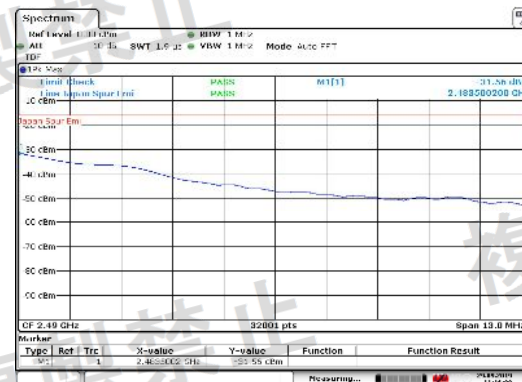
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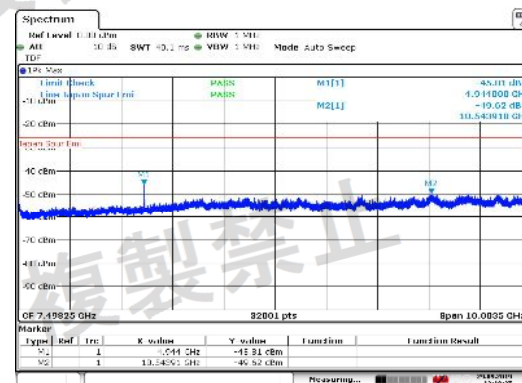
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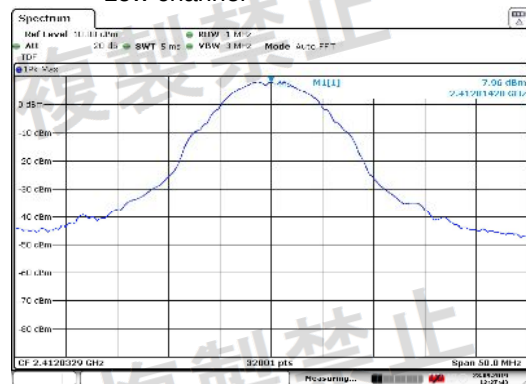
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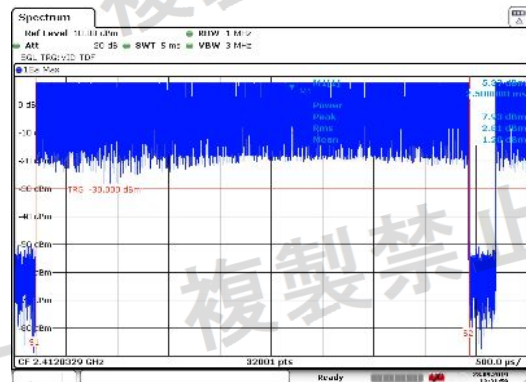
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Antenna Power

Low channel



File: 29.9EP.29.D 2012184

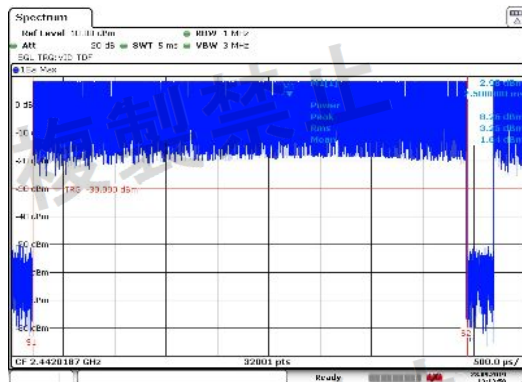


File: 29.9EP.29.D 2012189

Middle channel



File: 29.9EP.29.D 2012189



File: 29.9EP.29.D 2012189

High channel



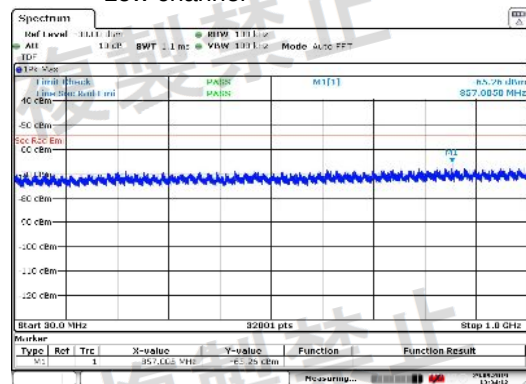
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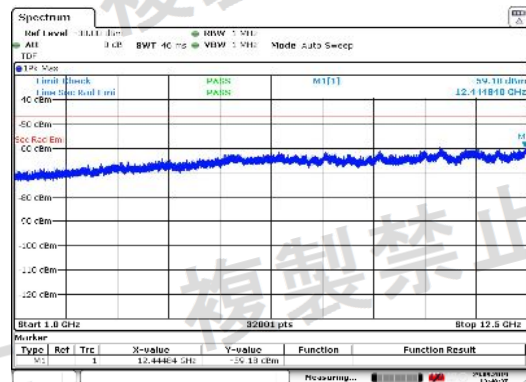
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Secondary Radiated Emissions

Low channel

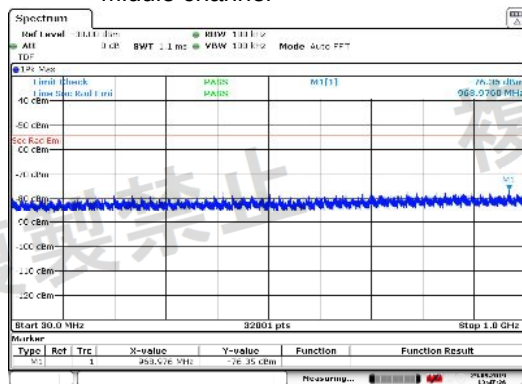


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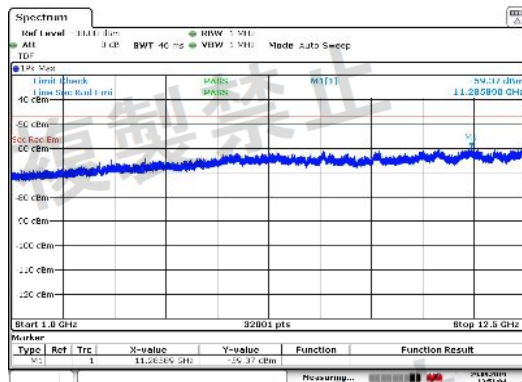


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Middle channel

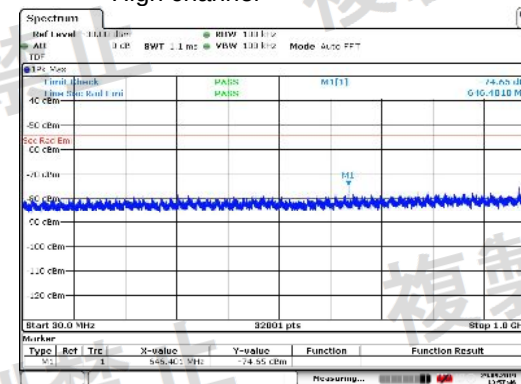


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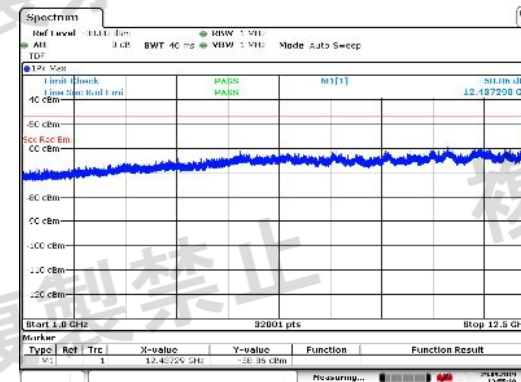


File: 2019SEP29.D 23:52:19

High channel



File: 2019SEP29.D 23:57:47



File: 2019SEP29.D 23:57:19

Test result and instruments about Type certificate

1. General

Model name	WFM200SA, WFM200SN	Date	28.-30.9.2019
Serial number		Place	SGS Fimko Ltd, Karakaarenkuja 4, FI-02610 Espoo
Class of emissions, Assigned frequency and Antenna power	G1D, D1D, 2412-2472 MHz, 0.0025 W/MHz	Remarks	11g, Antenna port 2

2. Measuring Instruments

Equipment type	Model number	Serial number	Manufacturer	Calibrated Date	Calibration Authority	Remarks
Signal Analyzer	FSV40	101838	Rohde & Schwarz	07 February 2019	Rohde & Schwarz (c)	SGS Inv. 10881
Cable	EM40-3131-59	11,153,209,001	Megaphase	-	-	SGS Inv. C118
Attenuator	10 dB, DC-40 GHz	A2	Inmet	1 April 2019	SGS (c)	SGS Inv. 10347
Multimeter	21	40790690	Fluke	29 October 2018	SGS (c)	SGS Inv. 8253

3. Test Result

Condition	Test Items		Unit	Normal Voltage -9.1% (3.00 V)			Normal Voltage (3.30 V)			Normal Voltage +9.1% (3.60 V)			Judgment	Limit	Remarks
				2412	2442	2472	2412	2442	2472	2412	2442	2472			
Normal (23 °C, 41-58 %)	Frequency		MHz	2411.993	2441.978	2471.985	2411.992	2441.977	2471.984	2411.992	2441.975	2471.983	Pass		
			ppm	-3.03	-9.01	-6.11	-3.30	-9.56	-6.41	-3.46	-10.05	-6.81		±50ppm	
	Occupied Bandwidth		MHz	17.2413793	17.4812594	17.0914543	17.4512744	17.4512744	17.0014993	17.0914543	17.3613193	16.9115442	Pass	26MHz	
	Spurious Emissions	30MHz-2387MHz	dBm	-29.49	-49.26	-48.20	-30.58	-48.61	-48.73	-29.28	-47.80	-47.75	Pass	-26dBm	
			MHz	2385.343	339.752	1741.534	2385.637	362.069	335.111	2386.890	340.856	346.970			
		2387MHz-2400MHz	dBm	-29.17	-51.85	-55.51	-28.35	-50.95	-56.50	-29.71	-51.68	-56.25	Pass	-16dBm	
			MHz	2399.377	2399.239	2393.656	2398.762	2397.925	2387.399	2399.774	2398.048	2399.199			
		2483.5MHz-2496.5MHz	dBm	-56.40	-50.44	-29.04	-56.46	-50.95	-29.40	-56.59	-49.33	-32.49	Pass	-16dBm	
			MHz	2483.673	2484.621	2483.639	2488.350	2483.500	2483.822	2495.969	2485.963	2485.309			
		2496.5MHz-12.5GHz	dBm	-44.81	-46.88	-34.67	-41.60	-44.82	-31.52	-41.79	-44.03	-39.01	Pass	-26dBm	
			MHz	4823.020	4883.040	2497.280	4824.900	4885.860	2496.970	4825.840	4890.230	2498.530			
	Antenna Power		W/MHz	0.00063096	0.00082985	0.0006223	0.00078524	0.00081658	0.00079799	0.00072946	0.000877	0.00076208	Pass	0.01W/MHz	
			%	-74.761706	-66.805969	-75.107989	-68.590575	-67.336705	-68.080213	-70.8217	-64.919967	-69.51684		+20 ~ -80%	
	Secondary Radiated Emissions	30MHz-1GHz	dBm	-66.76	-76.04	-74.19	-65.26	-76.35	-74.65	-66.92	-76.63	-74.12	Pass	-54dBm	
			MHz	951.517	952.335	969.613	857.005	968.976	646.401	969.128	968.249	969.613			
		1GHz-12.5GHz	dBm	-59.63	-58.99	-58.68	-59.18	-59.37	-58.86	-59.31	-59.37	-58.95	Pass	-47dBm	
			MHz	12448.070	12279.170	12483.650	12444.840	11285.89	12437.290	12456.340	12479.340	11297.030			
	Interference Prevention Function				Function was checked by obtaining MAC address of the EUT: 08:6b:d7:d6:f8:2d									Pass	

Note:

The final product does not support operation with ±10% of the nominal 3.30 V voltage, so the equipment was tested with its supported extreme voltages 3.00 and 3.60 V.

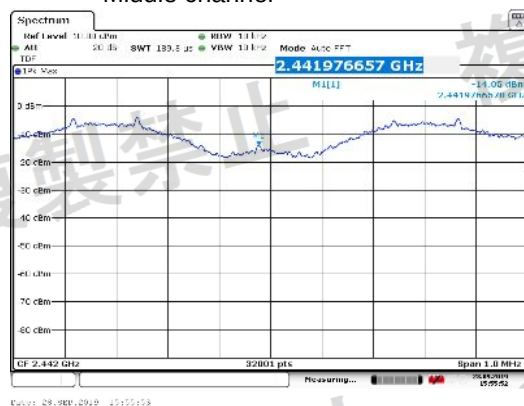
Screen Shot at normal voltage

Frequency

Low channel



Middle channel



High channel



Occupied Bandwidth

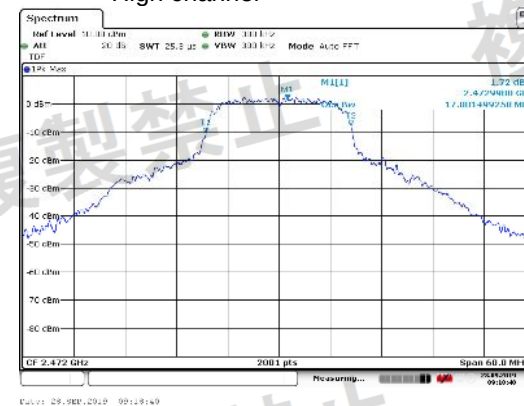
Low channel



Middle channel

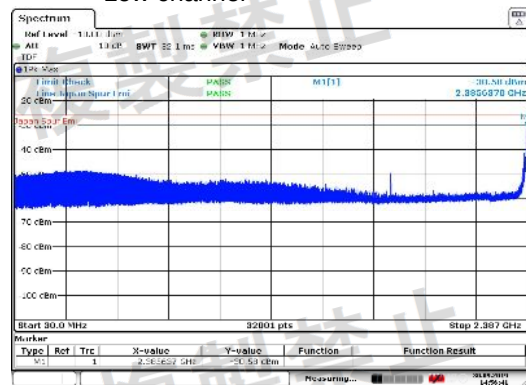


High channel

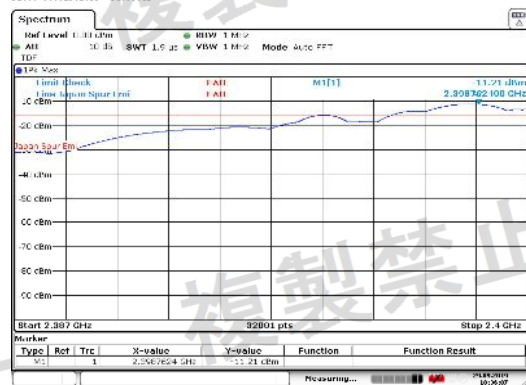


Spurious Emission Intensity

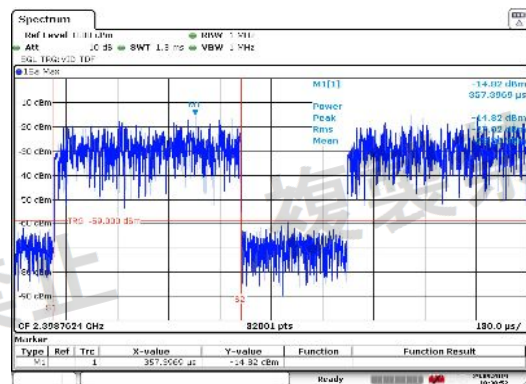
Low channel



File: 20_9EP_29.0 20101010

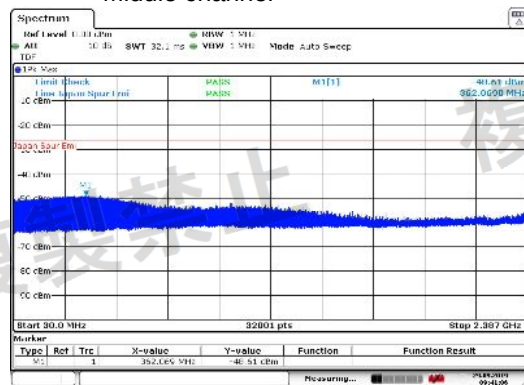


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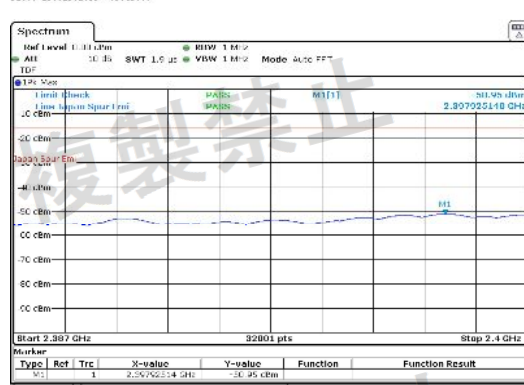


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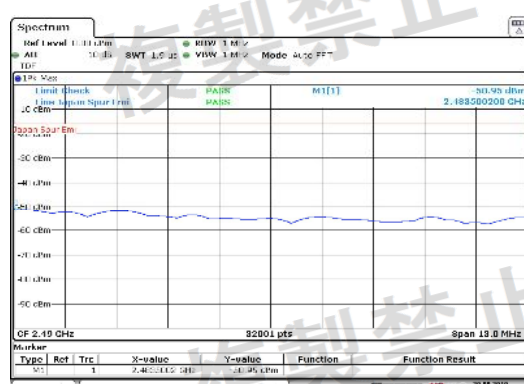
Middle channel



File: 20_9EP_29.0 20101010

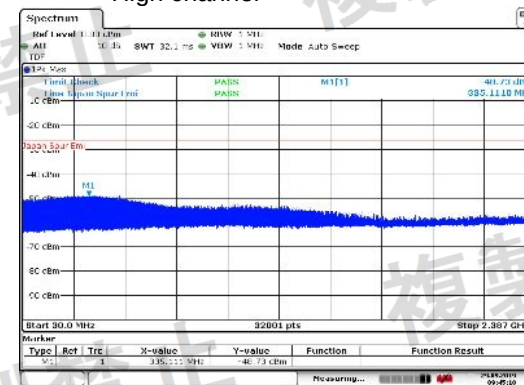


File: 20_9EP_29.0 20101010

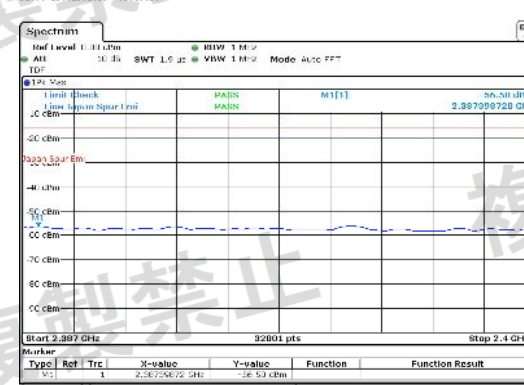


File: 20_9EP_29.0 20101010

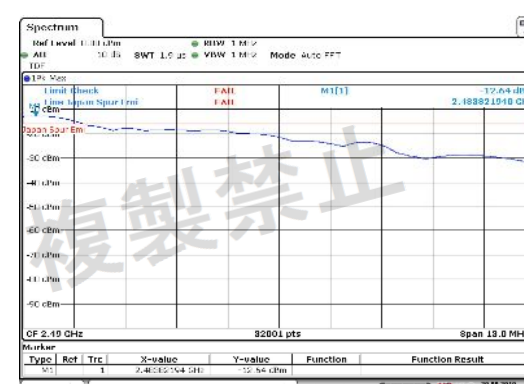
High channel



File: 20_9EP_29.0 20101010



File: 20_9EP_29.0 20101010



File: 20_9EP_29.0 20101010



Figure 20: SEP, 2019 11:12:45

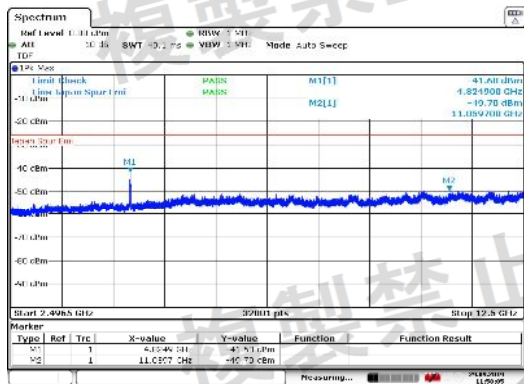


Figure 21: SEP, 2019 11:12:45

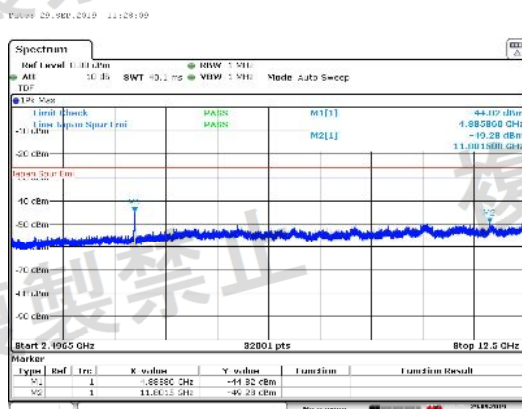


Figure 22: SEP, 2019 11:12:45

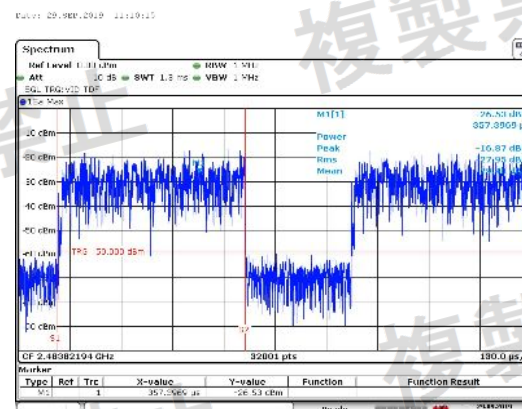


Figure 23: SEP, 2019 11:12:45

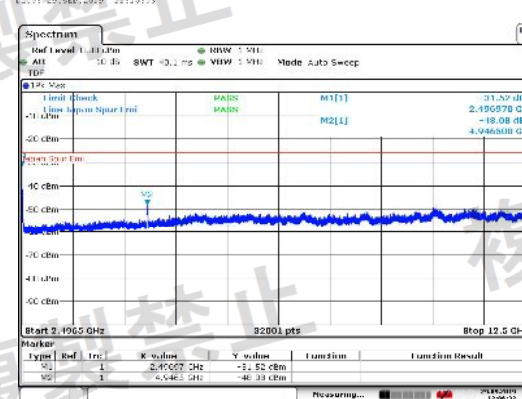


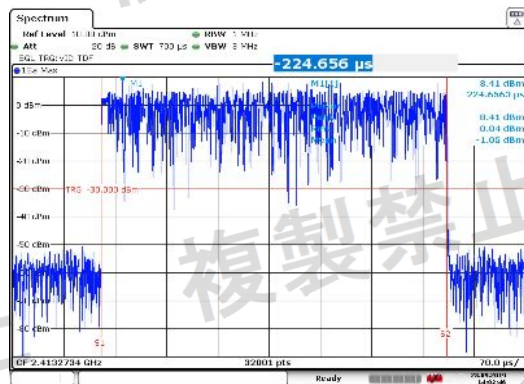
Figure 24: SEP, 2019 11:12:45

Antenna Power

Low channel



File: 29.9EP.29.D 241219.1

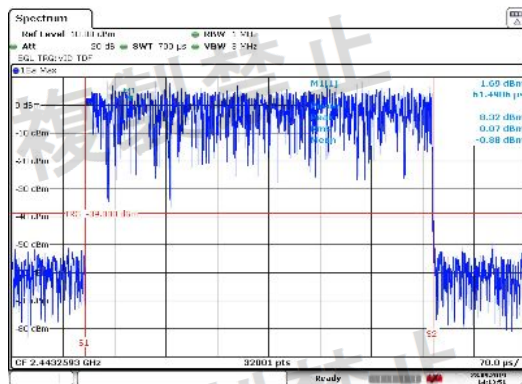


File: 29.9EP.29.D 241219.1

Middle channel



File: 29.9EP.29.D 241219.2

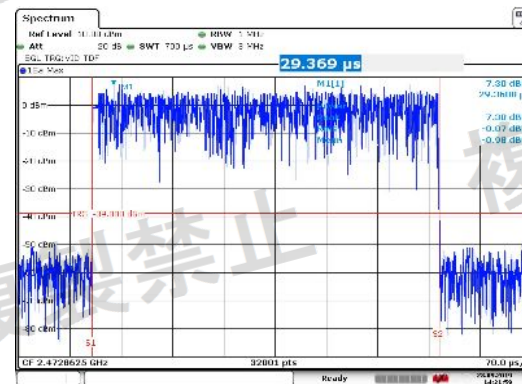


File: 29.9EP.29.D 241219.2

High channel

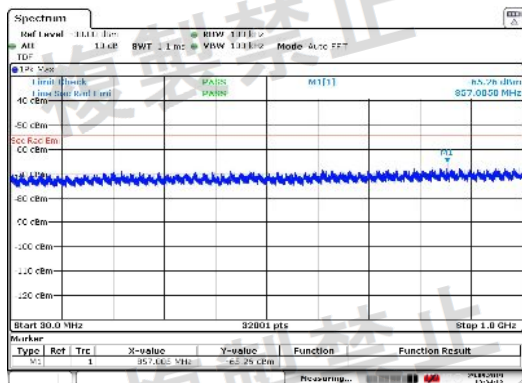


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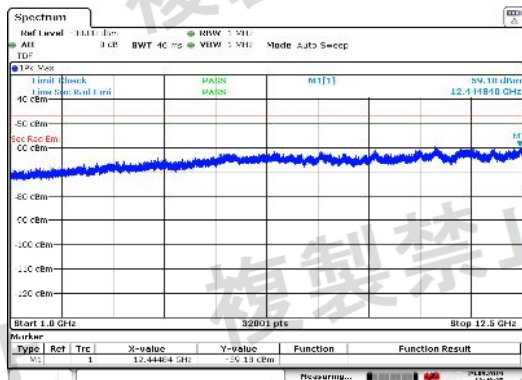


File: 29.9EP.29.D 241219.4

Secondary Radiated Emissions Low channel

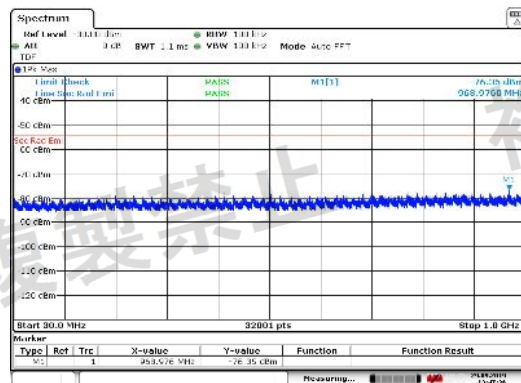


Event 20-SEP-2019 13:34:13

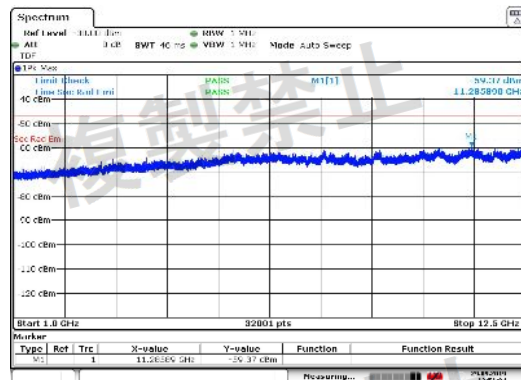


Event 20-SEP-2019 13:40:37

Middle channel

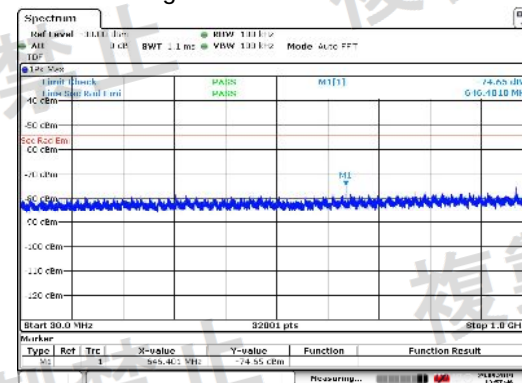


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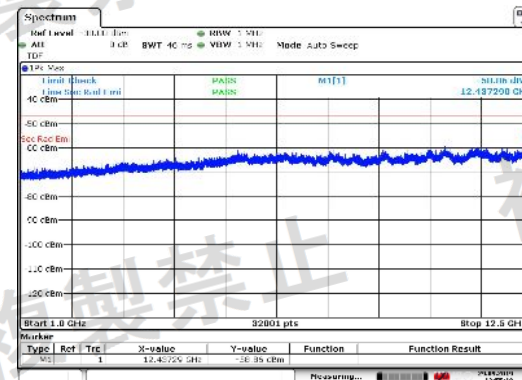


Event 20-SEP-2019 13:52:50

High channel



Event 20-SEP-2019 13:57:42



Event 20-SEP-2019 13:58:19

Test result and instruments about Type certificate

1. General

Model name	WFM200SA, WFM200SN	Date	28.-29.9.2019
Serial number		Place	SGS Fimko Ltd, Karakaarenkuja 4, FI-02610 Espoo
Class of emissions, Assigned frequency and Antenna power	G1D, D1D, 2412-2472 MHz, 0.0025 W/MHz	Remarks	11n(HT20), Antenna port 2

2. Measuring Instruments

Equipment type	Model number	Serial number	Manufacturer	Calibrated Date	Calibration Authority	Remarks
Signal Analyzer	FSV40	101838	Rohde & Schwarz	07 February 2019	Rohde & Schwarz (c)	SGS Inv. 10881
Cable	EM40-3131-59	11,153,209,001	Megaphase	-	-	SGS Inv. C118
Attenuator	10 dB, DC-40 GHz	A2	Inmet	1 April 2019	SGS (c)	SGS Inv. 10347
Multimeter	21	40790690	Fluke	29 October 2018	SGS (c)	SGS Inv. 8253

3. Test Result

Condition	Test Items		Unit	Normal Voltage -9.1% (3.00 V)			Normal Voltage (3.30 V)			Normal Voltage +9.1% (3.60 V)			Judgment	Limit	Remarks
				2412	2442	2472	2412	2442	2472	2412	2442	2472			
Normal (23 °C, 41-58 %)	Frequency		MHz	2411.984	2441.995	2471.987	2411.988	2441.987	2471.986	2411.974	2441.986	2471.983	Pass		
			ppm	-6.71	-1.88	-5.33	-5.12	-5.39	-5.82	-10.91	-5.89	-6.70		±50ppm	
	Occupied Bandwidth		MHz	17.7511244	17.7511244	17.6611694	17.7211394	17.7511244	17.6911544	17.7211394	17.6611694	17.6011994	Pass	26MHz	
	Spurious Emissions	30MHz-2387MHz	dBm	-34.01	-48.94	-49.56	-30.94	-48.65	-48.56	-34.08	-48.11	-47.56	Pass	-26dBm	
			MHz	2385.711	1741.607	346.454	2386.816	243.560	332.386	2386.963	347.043	340.930			
		2387MHz-2400MHz	dBm	-30.83	-52.77	-55.77	-30.11	-51.25	-56.17	-30.42	-52.30	-55.83	Pass	-16dBm	
			MHz	2398.520	2399.960	2389.376	2398.358	2399.722	2387.376	2399.617	2391.770	2390.195			
		2483.5MHz-2496.5MHz	dBm	-55.64	-50.42	-30.38	-56.99	-51.08	-29.99	-55.74	-50.80	-31.51	Pass	-16dBm	
			MHz	2486.157	2485.723	2483.500	2485.019	2483.500	2483.500	2483.519	2484.761	2483.568			
		2496.5MHz-12.5GHz	dBm	-45.64	-48.81	-36.78	-45.02	-47.72	-38.13	-44.01	-45.97	-39.59	Pass	-26dBm	
			MHz	4825.210	4883.670	2496.660	4824.590	4884.290	2498.530	4824.590	4885.230	2496.660			
	Antenna Power		W/MHz	0.00070469	0.00056754	0.0005224	0.00066988	0.00067608	0.00055976	0.00060395	0.00057544	0.00066069	Pass	0.01W/MHz	
			%	-71.812277	-77.298216	-79.104152	-73.204616	-72.956681	-77.609696	-75.842055	-76.982403	-73.572262		+20 ~ -80%	
	Secondary Radiated Emissions	30MHz-1GHz	dBm	-66.76	-76.04	-74.19	-65.26	-76.35	-74.65	-66.92	-76.63	-74.12	Pass	-54dBm	
			MHz	951.517	952.335	969.613	857.005	968.976	646.401	969.128	968.249	969.613			
		1GHz-12.5GHz	dBm	-59.63	-58.99	-58.68	-59.18	-59.37	-58.86	-59.31	-59.37	-58.95	Pass	-47dBm	
			MHz	12448.070	12279.170	12483.650	12444.840	11285.89	12437.290	12456.340	12479.340	11297.030			
	Interference Prevention Function			Function was checked by obtaining MAC address of the EUT: 08:6b:d7:d6:f8:2d									Pass		

Note:

The final product does not support operation with ±10% of the nominal 3.30 V voltage, so the equipment was tested with its supported extreme voltages 3.00 and 3.60 V.

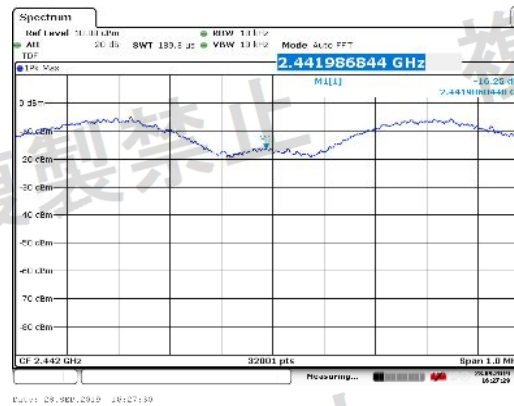
Screen Shot at normal voltage

Frequency

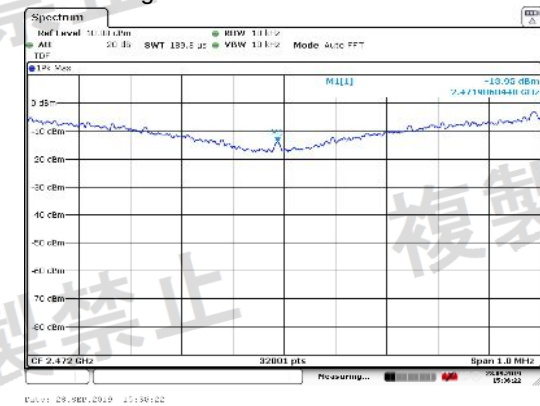
Low channel



Middle channel

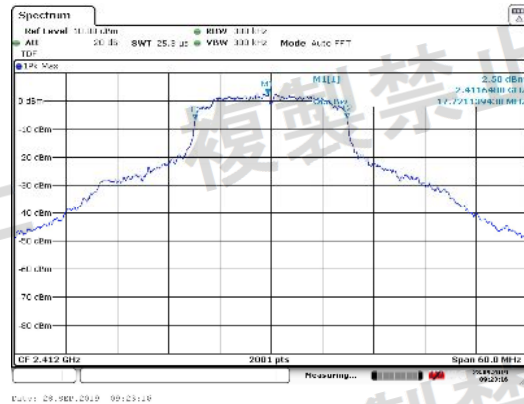


High channel

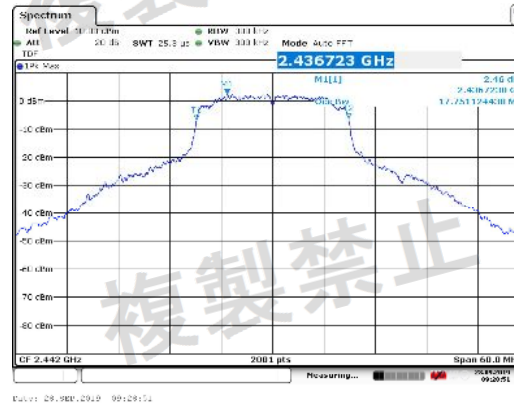


Occupied Bandwidth

Low channel



Middle channel

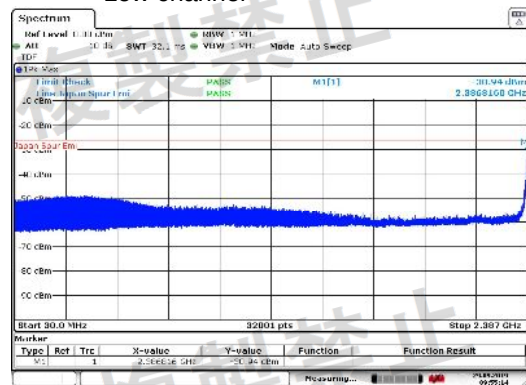


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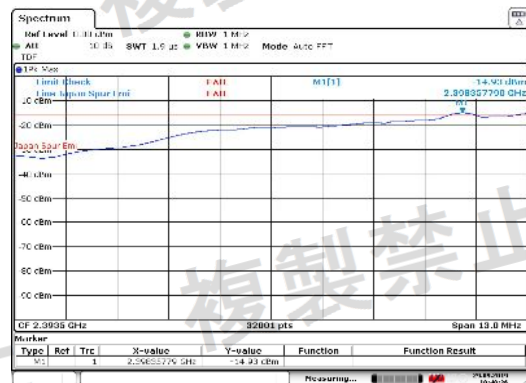


Spurious Emission Intensity

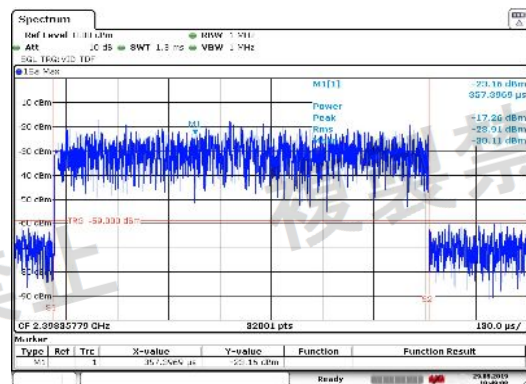
Low channel



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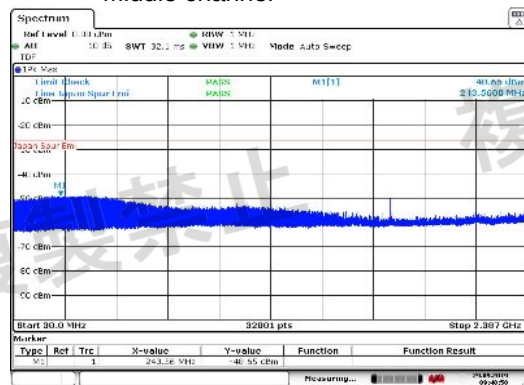


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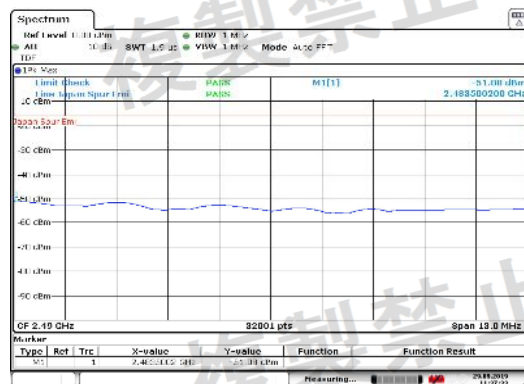
Middle channel



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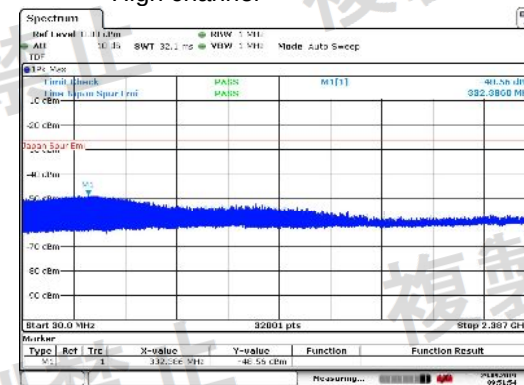


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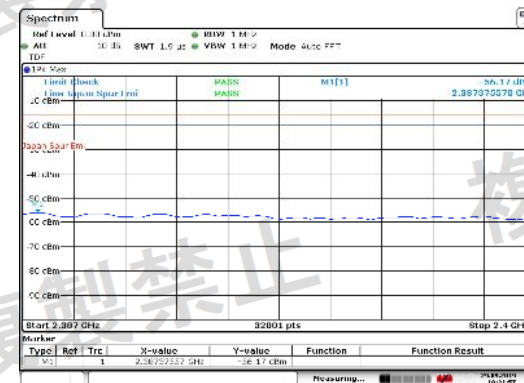


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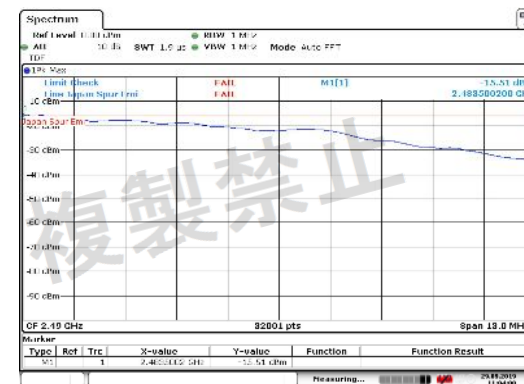
High channel



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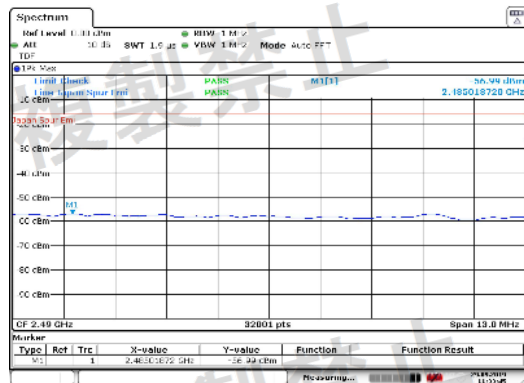


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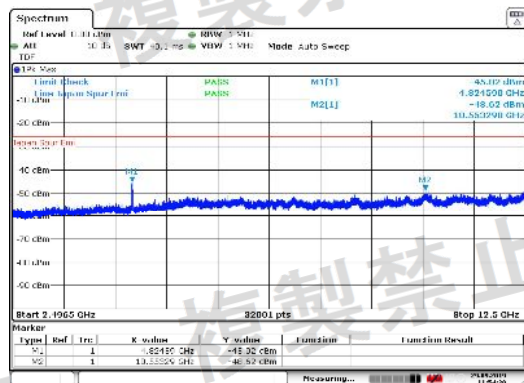


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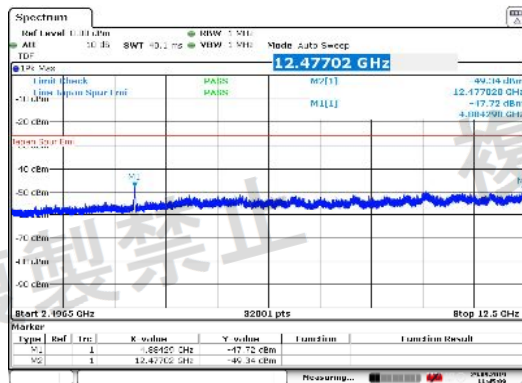


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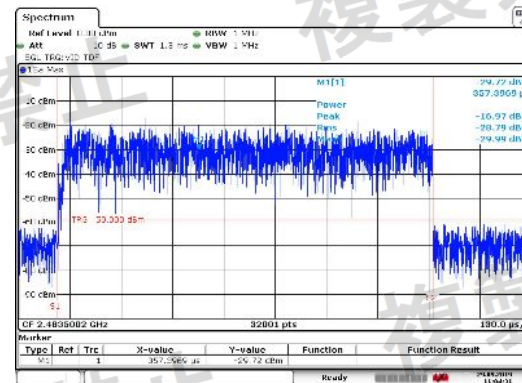
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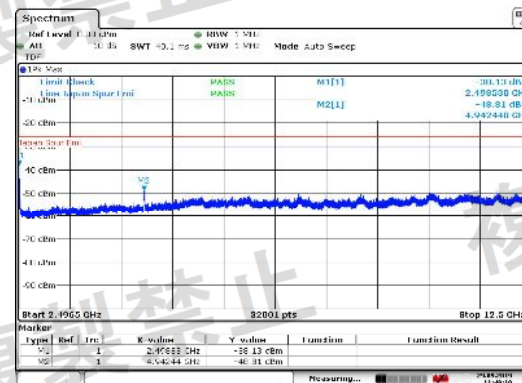


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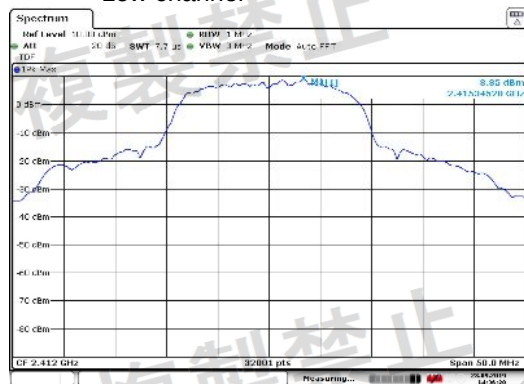
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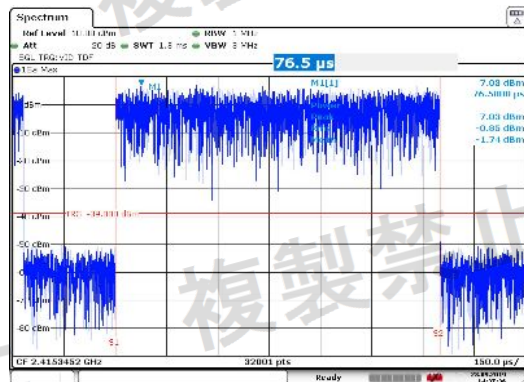
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Antenna Power

Low channel



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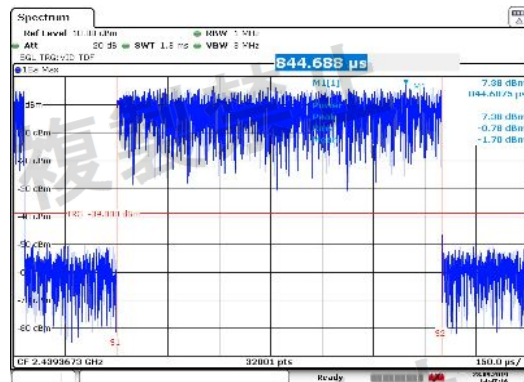


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Middle channel



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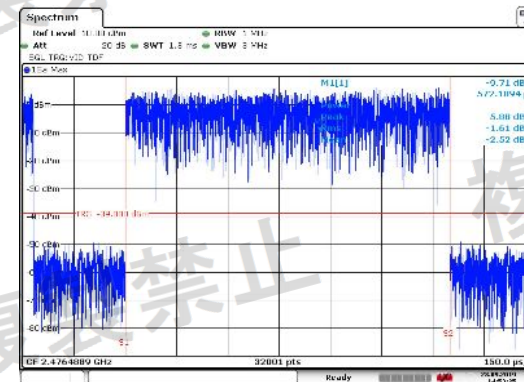


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High channel



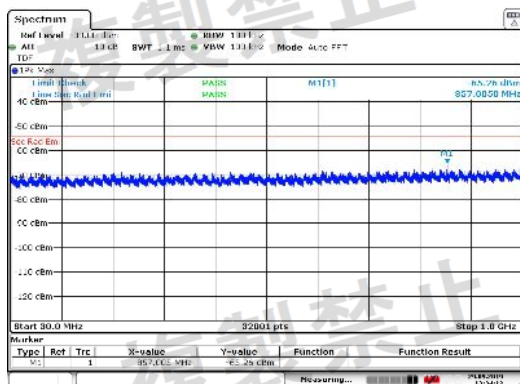
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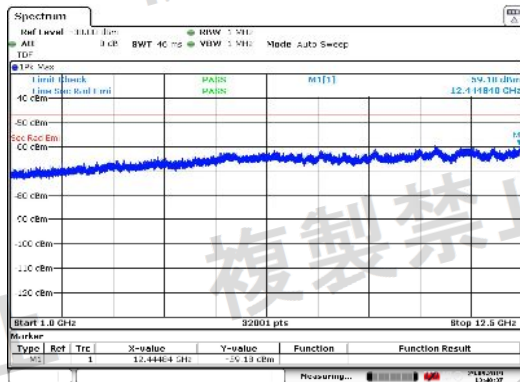
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Secondary Radiated Emissions

Low channel

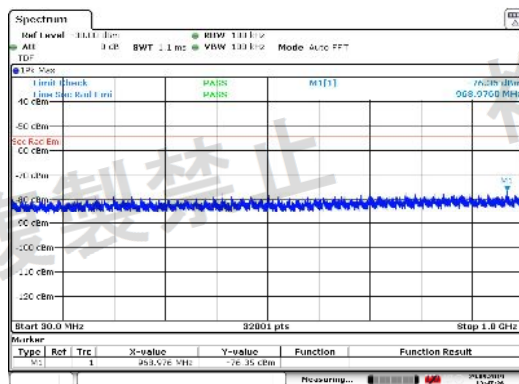


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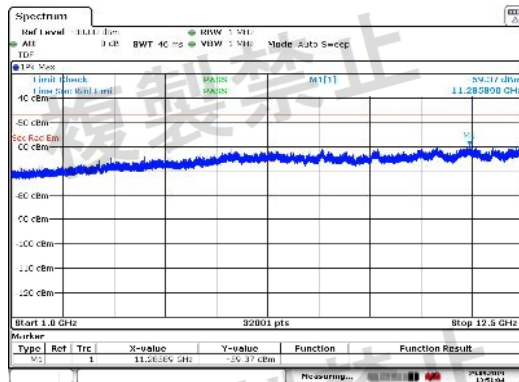


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Middle channel

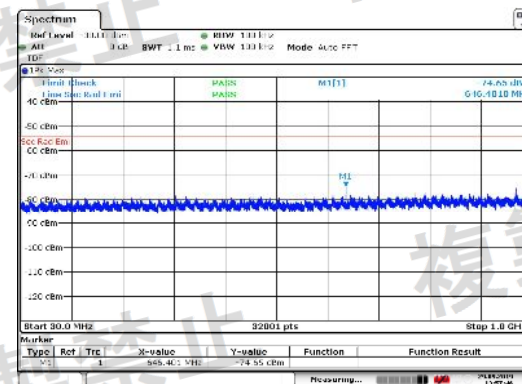


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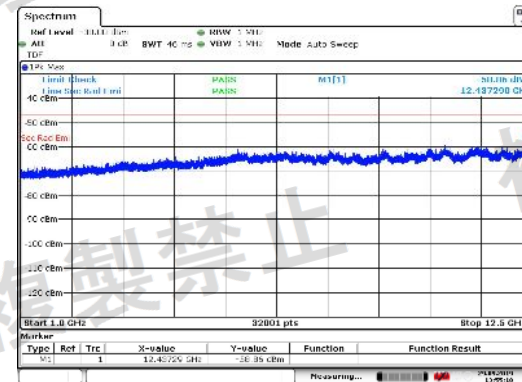


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High channel



File: 20-SEP-2019 13:14:13



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