

4 Test Summary

Electromagnetic Compatibility (EMC) Part				
Electromagnetic Interference (EMI)				
Test item	Test Requirement	Test Method	Limit	Result
Radiated Emission §	EN 55032	EN 55032	Clause A.2	FAIL
Conducted Emission (Signal port)	EN 55032	EN 55032	Clause A.3	PASS
Conducted Emission (DC power port)	EN IEC 61000-6-3	IEC 61000-6-3	Table 5 of EN IEC 61000-6-3	FAIL
Electromagnetic Susceptibility (EMS)				
Power frequency magnetic field	EN 55035	IEC 61000-4-8:2009	Clause 5	PASS
Electrical fast transients/burst (EFT/B)	EN 55035	IEC 61000-4-4:2012	Clause 5	FAIL
Continuous induced RF disturbances	EN 55035	IEC 61000-4-6:2008	Clause 5	PASS
<p>Remark:</p> <p>§ If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. (Refer to EN 55032:2015+A11:2020 Clause 8 table 1 Conditional testing procedure)</p> <p>§ If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. (Refer to EN 55032:2015+A11:2020 Clause 8 table 1 Conditional testing procedure)</p> <p>§ If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. (Refer to EN 55032:2015+A11:2020 Clause 8 table 1 Conditional testing procedure)</p> <p>§ If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less. (Refer to EN 55032:2015+A11:2020 Clause 8 table 1 Conditional testing procedure)</p> <p>The company Name and Address, the tested sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which JYT hasn't verified.</p> <p>Tx: In this whole report Tx (or tx) means Transmitter. Rx: In this whole report Rx (or rx) means Receiver. RF: In this whole report RF means Radiated Frequency. CH: In this whole report CH means channel. Volt: In this whole report Volt means Voltage. Temperature: In this whole report Temp means Temperature. Humidity: In this whole report Humid means humidity. Press: In this whole report Press means Pressure.</p>				

5 General Information

5.1 Client Information

Applicant:	Kapek Ltd
Address of Applicant:	4 Pavilion Court 600 Pavilion Drive, Northampton Business Park, Northampton, England, NN4 7SL
Manufacturer:	Kapek Ltd
Address of Manufacturer:	4 Pavilion Court 600 Pavilion Drive, Northampton Business Park, Northampton, England, NN4 7SL

5.2 General Description of EUT

Product Name:	GigaBlox Rugged
Model No.:	BB-GGR-C-2
Test mode No.:	BB-GGR-C-2
Trade Mark:	N/A
Power Supply:	DC 5-30V

5.3 Product Specification subjective to this standard

Highest Frequency:	>1.2GHz
Sample Type:	Internal installation production
Test voltage:	DC 12V

5.4 Test Mode and test samples plans

Operating mode	Detail description
1 Port network test(1Gbps)	Keep Port 1 of EUT at maximum rate(1Gbps) for data transmission testing
2 Ports network test(1Gbps)	Keep Port 1&4 of EUT at maximum rate(1Gbps) for data transmission testing
Test Samples Plans:	
Samples Number	Used for Test Items
<i>SZR012400273-1</i>	EMI Test Items
<i>SZR012400273-1</i>	EMS Test Items
<i>SZR012400273-1</i>	EUT constructional details

5.5 Description of Support Units

The EUT has been tested independently and or

The EUT has been tested with associated equipment below.

1) support equipment

Description	Manufacturer	Model No.	Certification	Supplied by	Serial Number
Exchange	N/A	N/A	N/A	Client	N/A
PC	N/A	N/A	N/A	Client	N/A

2) Description of Cable Used

Cable No.	Description	Manufacturer	Cable Type/Length	Supplied by	Serial Number
1	N/A	N/A	N/A	N/A	N/A

5.6 Measurement Uncertainty (95% confidence levels, k=2)

Parameter	Expanded Uncertainty (Confidence of 95%)
Conducted disturbance (9kHz ~ 150kHz)	±3.6 dB
Conducted disturbance (150kHz ~ 30MHz)	±3.1 dB
Radiated Emission (9kHz ~ 30MHz) for 3m	±3.3 dB
Radiated Emission (30MHz ~ 200MHz) for 3m	±4.6 dB
Radiated Emission (200MHz ~ 1GHz) for 3m	±5.8 dB
Radiated Emission (1GHz ~	
Radiated Emission (30MHz ~ 1GHz) for 10m	
Temperature	
Humidity	

5.9 Monitoring of EUT for the Immunity Test

Visual:	Monitored the indicator light of EUT
Sound:	N/A
Other:	Monitored the data link of EUT

5.10 Equipment List

Radiated Emission 3m:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (yy-mm-dd)	Cal. Due date (yy-mm-dd)
3m SAC	ETS	RFD-100	Q1984	2021-04-14	2026-04-13
Low Pre-amplifier	SCHWARZBECK	BBV9743B	00305	2023-12-27	2024-12-26
High Pre-amplifier	SKET	LNPA_0118G-50	SK2021031201	2023-12-27	2024-12-26
BiConiLog Antenna	SCHWARZBECK	VULB 9163	9163-1246	2024-01-09	2025-01-08
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-916	2024-01-04	2025-01-03
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1805	2023-12-28	2024-12-27
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-044	2024-01-05	2025-01-04
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1067	2023-12-28	2024-12-27
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1068	2023-12-28	2024-12-27
Pre-amplifier	RF System	TRLA-180400G45B	20120401	2023-12-27	2024-12-26
Pre-amplifier	RF System	TRLA-180400G45B	20120402	2023-12-27	2024-12-26
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	2023-12-27	2024-12-26
Spectrum analyzer	Rohde & Schwarz	FSP 30	101454	2023-12-27	2024-12-26
Spectrum analyzer	Keysight	N9010B	MY60240202	2023-09-25	2024-09-24

Power frequency magnetic field:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (yy-mm-dd)	Cal. Due date (yy-mm-dd)
Power frequency					

Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (yy-mm-dd)	Cal. Due date (yy-mm-dd)
EMI Test Receiver	Rohde & Schwarz	ESR3	102889	2023-07-05	2024-07-04
EMI Room	ETS	RFD-60	S1669	2020-12-21	2025-12-20
LISN	Rohde & Schwarz	ESH3-Z5	843862/010	2023-12-27	2024-12-26
LISN	Rohde & Schwarz	ENV432	101602	2023-12-28	2024-12-27
ISN	Schwarzbeck	CAT3 8158	CAT3 8158#96	2023-12-27	2024-12-26
ISN	Schwarzbeck	CAT5 8158	CAT5 8158#166	2023-12-27	2024-12-26
ISN	Schwarzbeck	NTFM 8158	NTFM 8158#126	2023-12-27	2024-12-26
Coupling decoupling network	SCHWARZBECK	CDNE M2	160	2023-12-27	2024-12-26
Coupling decoupling network	SCHWARZBECK	CDNE M3	154	2023-12-27	2024-12-26
LISN	SCHWARZBECK	NSLK 8127	01038	2023-12-27	2024-12-26
LISN	SCHWARZBECK	NNLK 8121	00417	2024-04-13	2025-04-12
Limiter	N/A	PL0009030	PL0009030-021	2023-11-04	2024-11-03
Temperature					
EMI					

Injected currents:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (yy-mm-dd)	Cal. Due date (yy-mm-dd)
Conducted interference test system	SCHLODER	CDG 6000	126B1445/2016	2023-12-27	2024-12-26
Coupling/Decoupling Network	SCHLODER	CDN M2+M3-16A	A2210417/2016	2023-12-27	2024-12-26
EM Clamp	SCHLODER	EMCL-20	132A1281/2016	2023-12-27	2024-12-26
Coupling/Decoupling	SCHLODER	CDN M5-32A	10204-1	2023-12-27	2024-12-26
Temperature and humidity					

EFT SURGE V-Dip:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (yy-mm-dd)	Cal. Due date (yy-mm-dd)
Voltage dips and Interruption test module	EMC PARTNER	EXT-IMU D	1723	2023-12-27	2024-12-26
Coupling decoupling network of power line	EMC PARTNER	CDN-A-6-32	109037-3063	2023-12-27	2024-12-26
Lightning surge high speed communication line coupling network 8 lines	EMC PARTNER	CDN-UTP8 ED3	CDN-UTP8ED3-1594	2023-12-27	2024-12-26
Lightning test system module	EMC PARTNER	EXT-IMU3000S6 (Surge1.2/50us)	1652	2023-12-27	2024-12-26
Lightning test module of telecommunication terminal	EMC PARTNER	EXT-IMU3000 T6(Surge 10/700μs)	1568	2023-12-27	2024-12-26
EFT test system module	EMC PARTNER	EXT-IMU3000F5	1626	2023-12-27	2024-12-26
Capacitive coupling clamp		CN-EFT1000/VERI-	CN-EFT1000-		

6 Emission Test Results

6.1 Radiated Emissions

Test Requirement:	EN 55032			
Test Method:	EN 55032			
Test Frequency Range:	30MHz to 6GHz			
Test Distance:	3m			
Receive Setup:	Frequency range (MHz)	Detector	RBW	VBW
	30-1000	Quasi-peak	120kHz	300kHz
	Above 1000	Peak	1MHz	3MHz
Limit:	Table 1: Requirements for radiated emissions for Class B equipment			
	Frequency	Limit(@3m)	Detector	
	30MHz-230MHz	40dB μ V/m	QP	
	230MHz-1GHz	47dB μ V/m	QP	
	1GHz-3GHz	50dB μ V/m	Average	
70dB μ V/m		PK		
3GHz-6GHz	54dB μ V/m	Average		
	74dB μ V/m	PK		

Test Setup:

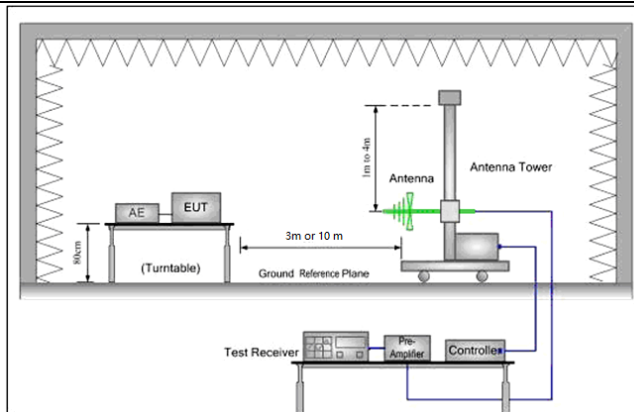


Figure 1. 30MHz to 1GHz

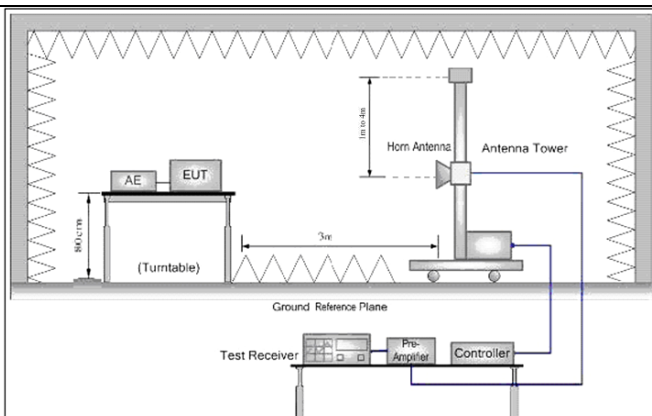
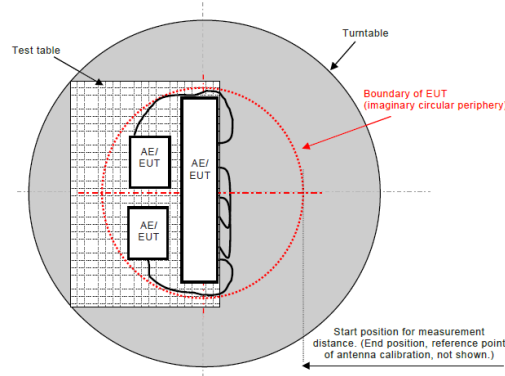
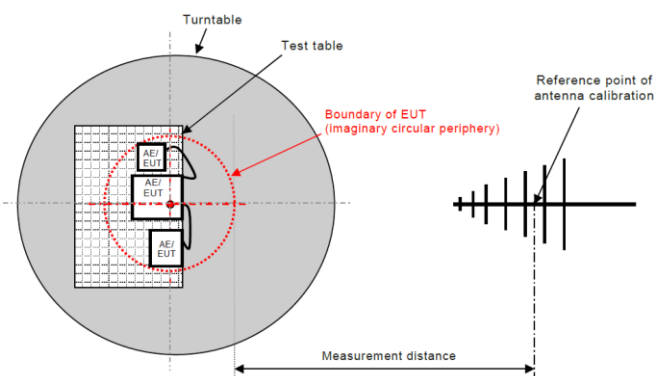


Figure 2. Above 1 GHz

EUT setup:

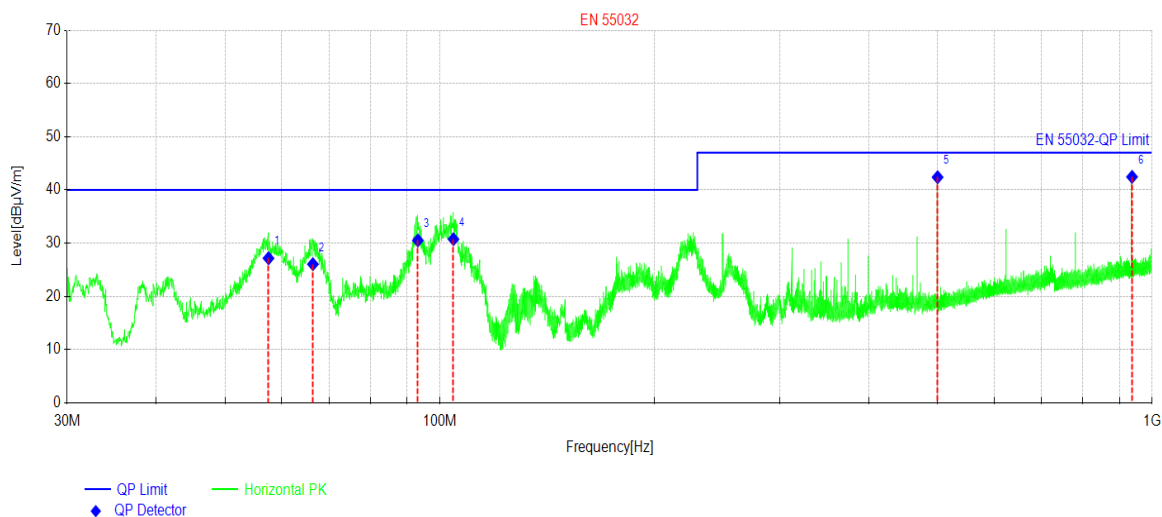


Test Procedure:	30MHz to 1GHz:
	<ol style="list-style-type: none"> 1. The radiated emissions test was conducted in a semi-anechoic chamber. 2. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

	<ol style="list-style-type: none"> 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization. <p>Above 1GHz:</p> <ol style="list-style-type: none"> 1. The radiated emissions test was conducted in a fully-anechoic chamber. 2. The tabletop EUT was placed upon anon-metallic table0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation. 3. Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emission spectrum plots of the EUT. 4. The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.
Equipment Used:	Refer to section 5.10 for details.
Exploratory Test Mode:	Refer to section 5.4 for details
Test result:	FAIL

**Measurement Data:
Below 1GHz:**

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2
Tester by:	Tom Chen	Test mode:	1 Port network test(1Gbps)
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test voltage:	DC 12V	Sample Number	SZR012400273-1
Environment:	Temperature: 23.6°C	Humidity: 52%	Press:101kpa

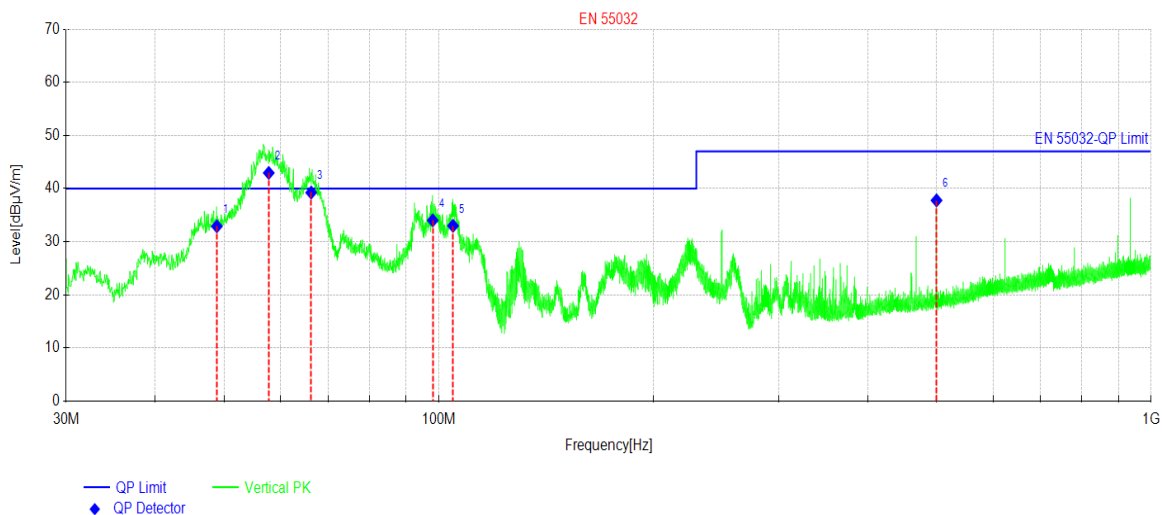


N O.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Angle [°]
1	57.4995	40.99	-13.82	27.17	40.00	12.83	347
2	66.3750	41.44	-15.38	26.06	40.00	13.94	302
3	93.1955	46.27	-15.76	30.51	40.00	9.49	4
4	104.5445	45.36	-14.60	30.76	40.00	9.24	216
5	500.0135	51.35	-8.96	42.39	47.00	4.61	302
6	937.5320	44.91	-2.46	42.45	47.00	4.55	307

Remark:

- 1) Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2
Tester by:	Tom Chen	Test mode:	1 Port network test(1Gbps)
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test voltage:	DC 12V	Sample Number	SZR012400273-1
Environment:	Temperature: 23.6°C	Humidity: 52%	Press:101kpa



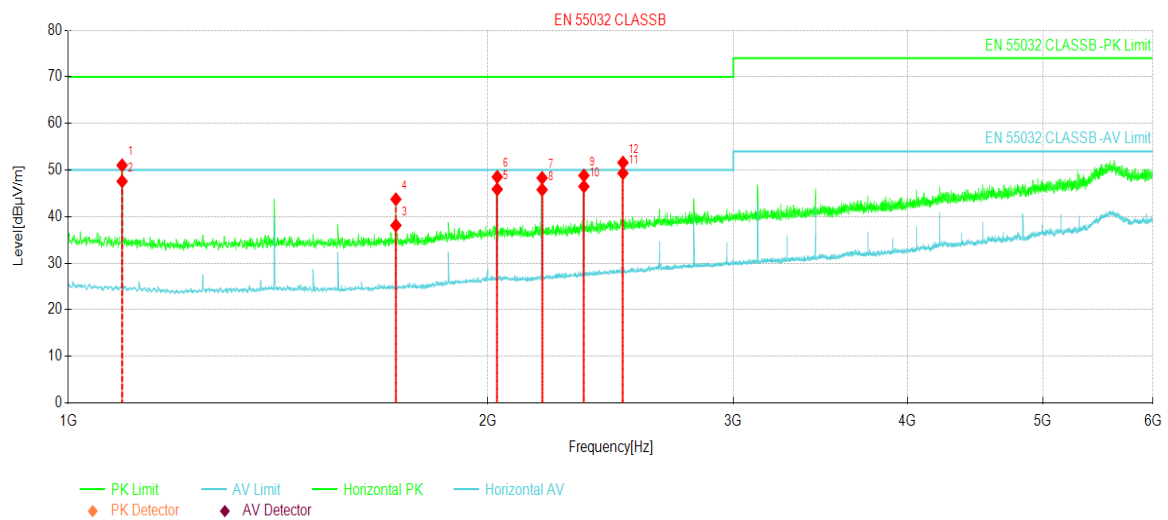
N O.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Angle [°]
1	48.8180	45.62	-12.72	32.90	40.00	7.10	160
2	57.7373	56.64	-13.69	42.95	40.00	-2.95	302.4
3	66.2200	54.45	-15.20	39.25	40.00	0.75	245.2
4	98.0940	48.99	-14.97	34.02	40.00	5.98	130
5	104.7385	47.6	-14.60	33.00	40.00	7.00	276
6	500.0135	46.74	-8.96	37.78	47.00	9.22	95

Remark:

- 1) Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.

Above 1GHz:

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2
Tester by:	Tom Chen	Test mode:	1 Port network test(1Gbps)
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Horizontal
Test voltage:	DC 12V	Sample Number	SZR012400273-1
Environment:	Temperature: 23.3°C	Humidity: 52%	Press:101kpa

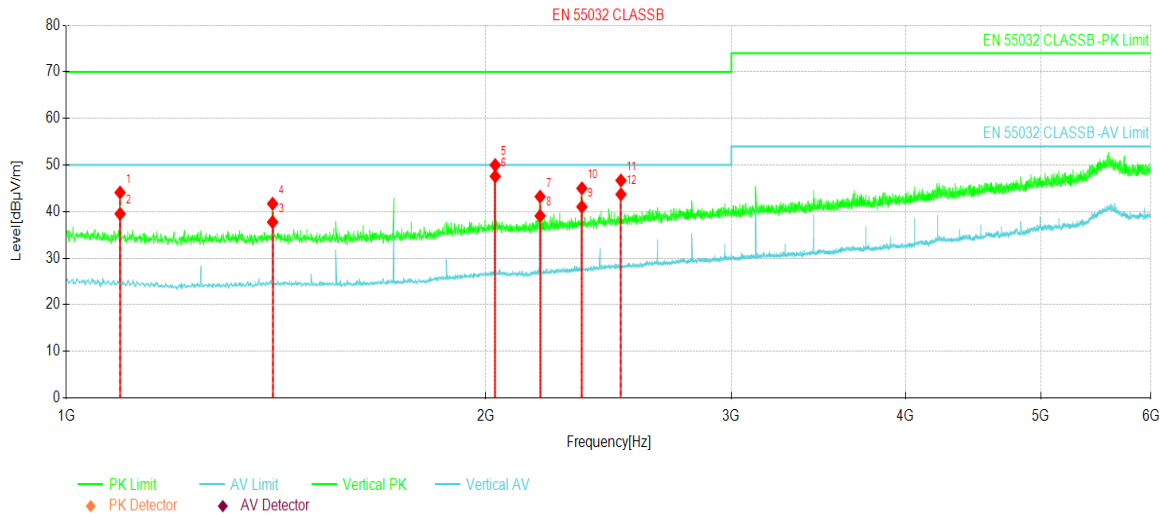


NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1093.1250	73.71	51.01	-22.70	70.00	18.99	PK	Horizontal
2	1093.1250	70.26	47.56	-22.70	50.00	2.44	AV	Horizontal
3	1718.1250	60.55	38.10	-22.45	50.00	11.90	AV	Horizontal
4	1718.1250	66.16	43.71	-22.45	70.00	26.29	PK	Horizontal
5	2031.2500	66.54	45.86	-20.68	50.00	4.14	AV	Horizontal
6	2031.2500	69.20	48.52	-20.68	70.00	21.48	PK	Horizontal
7	2187.5000	68.71	48.29	-20.42	70.00	21.71	PK	Horizontal
8	2187.5000	66.18	45.76	-20.42	50.00	4.24	AV	Horizontal
9	2343.7500	68.60	48.83	-19.77	70.00	21.17	PK	Horizontal
10	2343.7500	66.23	46.46	-19.77	50.00	3.54	AV	Horizontal
11	2500.0000	68.47	49.29	-19.18	50.00	0.71	AV	Horizontal
12	2500.0000	70.77	51.59	-19.18	70.00	18.41	PK	Horizontal

Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss - Pre-amplifier Factor.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2
Tester by:	Tom Chen	Test mode:	1 Port network test(1Gbps)
Test Frequency:	1 GHz ~ 6 GHz	Polarization:	Vertical
Test voltage:	DC 12V	Sample Number	SZR012400273-1
Environment:	Temperature: 23.3°C	Humidity: 52%	Press:101kpa



NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1093.1250	66.78	44.08	-22.70	70.00	25.92	PK	Vertical
2	1093.1250	62.21	39.51	-22.70	50.00	10.49	AV	Vertical
3	1406.2500	60.39	37.75	-22.64	50.00	12.25	AV	Vertical
4	1406.2500	64.32	41.68	-22.64	70.00	28.32	PK	Vertical
5	2031.2500	70.67	49.99	-20.68	70.00	20.01	PK	Vertical
6	2031.2500	68.24	47.56	-20.68	50.00	2.44	AV	Vertical
7	2187.5000	63.63	43.21	-20.42	70.00	26.79	PK	Vertical
8	2187.5000	59.50	39.08	-20.42	50.00	10.92	AV	Vertical
9	2343.7500	60.80	41.03	-19.77	50.00	8.97	AV	Vertical
10	2343.7500	64.76	44.99	-19.77	70.00	25.01	PK	Vertical
11	2500.0000	65.86	46.68	-19.18	70.00	23.32	PK	Vertical
12	2500.0000	62.88	43.70	-19.18	50.00	6.30	AV	Vertical

Remark:

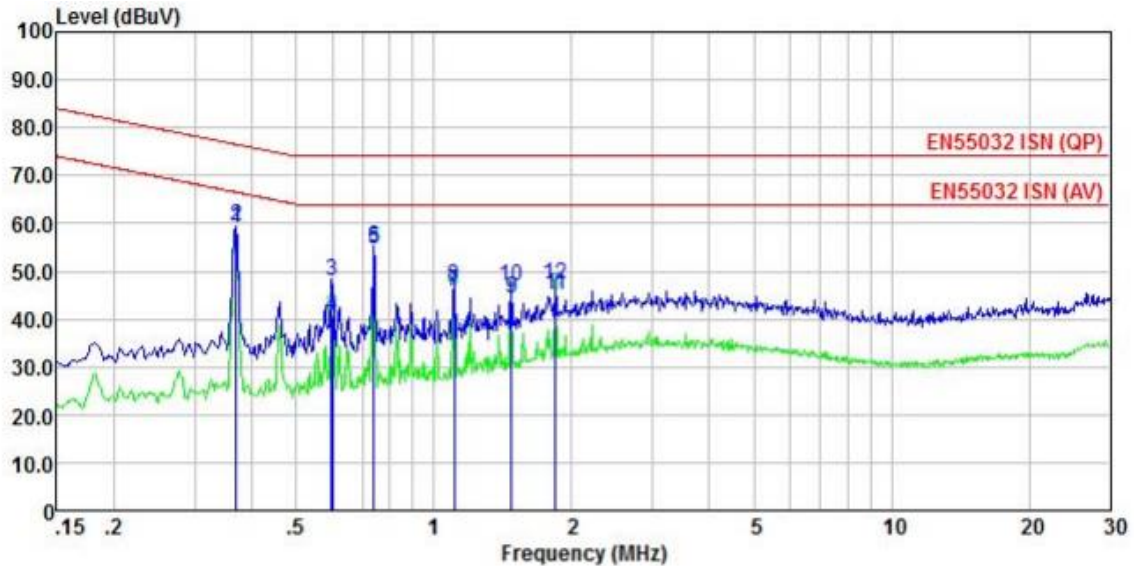
- 1) Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.

6.2 Conducted Emission

1) For wired network ports												
Test Requirement:	EN 55032											
Test Method:	EN 55032											
Detector:	Quasi-Peak if maximized peak within 6dB of Quasi-Peak limit											
Receiver setup:	RBW=9kHz, VBW=30kHz											
Test Mode:	Refer to section 5.4 for details											
Equipment Used:	Refer to section 5.10 for details.											
Limit:	<p>Limits for conducted common mode disturbance at telecommunication ports of class B</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency Range (MHz)</th> <th colspan="2">Class B Limit (dB μ V)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15 to 0.50</td> <td>84 to 74</td> <td>74 to 64</td> </tr> <tr> <td>0.50 to 30</td> <td>74</td> <td>64</td> </tr> </tbody> </table> <p>NOTE 1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.</p> <p>NOTE2: Applicable to ports listed above and intended to connect to cables longer than 3 m</p>	Frequency Range (MHz)	Class B Limit (dB μ V)		Quasi-peak	Average	0.15 to 0.50	84 to 74	74 to 64	0.50 to 30	74	64
Frequency Range (MHz)	Class B Limit (dB μ V)											
	Quasi-peak	Average										
0.15 to 0.50	84 to 74	74 to 64										
0.50 to 30	74	64										
Test Setup:												
Test Procedure:	<ol style="list-style-type: none"> 1) The telecommunication terminal disturbance voltage test was conducted in a shielded room. 2) The setup is the same as conduction besides this, connecting between AE and telecommunication port through AAN (Asymmetric Artificial Network). 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed upon a non-metallic table 0.1m above ground reference plane. 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The AAN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for AAN mounted on top of the ground reference plane. This distance was between the closest points of the AAN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the AMN. 											
Test result:	PASS											

Measurement Data:

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2
Tester by:	Jeremy Lin	Test mode:	1 Port network test(1Gbps)
Test frequency:	150 kHz ~ 30 MHz	Phase:	/
Test voltage:	DC 12V	Sample Number	SZR012400273-1
Environment:	Temperature: 24.0°C	Humidity: 50%	Press:101kpa



	Freq	Read Level	LISN Factor	Aux Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB	
1	0.369	38.53	10.03	0.00	10.50	0.03	59.09	66.52	-7.43	Average
2	0.369	38.73	10.03	0.00	10.50	0.03	59.29	76.52	-17.23	QP
3	0.598	27.76	9.69	0.00	10.50	0.02	47.97	74.00	-26.03	QP
4	0.601	20.38	9.69	0.00	10.50	0.02	40.59	64.00	-23.41	Average
5	0.739	34.45	9.56	0.00	10.50	0.03	54.54	64.00	-9.46	Average
6	0.739	34.87	9.56	0.00	10.50	0.03	54.96	74.00	-19.04	QP
7	1.106	25.94	9.33	0.00	10.50	0.07	45.84	64.00	-18.16	Average
8	1.106	26.89	9.33	0.00	10.50	0.07	46.79	74.00	-27.21	QP
9	1.480	24.28	9.41	0.00	10.50	0.14	44.33	64.00	-19.67	Average
10	1.480	26.78	9.41	0.00	10.50	0.14	46.83	74.00	-27.17	QP
11	1.848	24.67	9.48	0.00	10.50	0.19	44.84	64.00	-19.16	Average
12	1.848	26.99	9.48	0.00	10.50	0.19	47.16	74.00	-26.84	QP

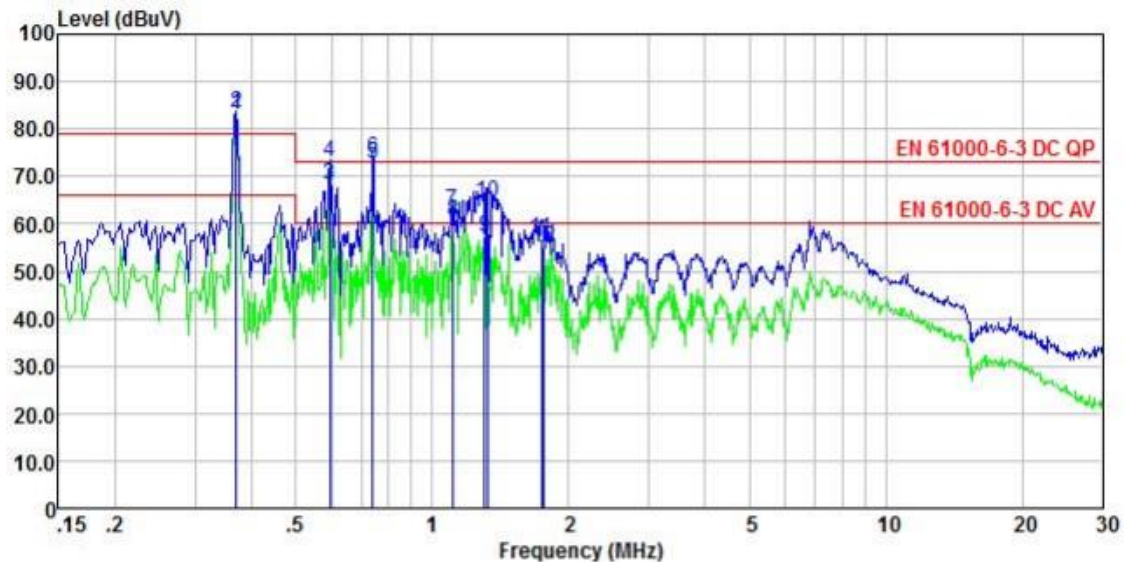
Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

2) For DC Power Port												
Test Requirement:	EN IEC 61000-6-3											
Test Method:	IEC 61000-6-3											
Detector:	Quasi-Peak if maximized peak within 6dB of Quasi-Peak limit											
Receiver setup:	RBW=9kHz, VBW=30kHz											
Exploratory Test Mode:	Refer to section 5.4 for details											
Equipment Used:	Refer to section 5.10 for details.											
Limit:	<p>Limits for conducted disturbance at the DC power ports</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency Range (MHz)</th> <th colspan="2">Limit (dBμV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15 to 0.50</td> <td>79</td> <td>66</td> </tr> <tr> <td>5 to 30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>NOTE 1: The lower limit is applicable at the transition frequency.</p>	Frequency Range (MHz)	Limit (dB μ V)		Quasi-peak	Average	0.15 to 0.50	79	66	5 to 30	60	50
Frequency Range (MHz)	Limit (dB μ V)											
	Quasi-peak	Average										
0.15 to 0.50	79	66										
5 to 30	60	50										
Test Setup:	<p>Test set-up for tabletop equipment</p>											
Test Procedure:	<ol style="list-style-type: none"> 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a AMN (Artificial Mains Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second AMN, which was bonded to the ground reference plane in the same way as the AMN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single AMN provided the rating of the AMN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed upon a non-metallic table 0.1m above ground reference plane. 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The AMN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for AMN mounted on top of the ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the AMN. 											
Test result:	FAIL											

Measurement Data:

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2
Tester by:	Jeremy Lin	Test mode:	1 Port network test(1Gbps)
Test frequency:	150 kHz ~ 30 MHz	Phase:	Positive
Test voltage:	DC 12V	Sample Number	SZR012400273-1
Environment:	Temperature: 24.0°C	Humidity: 50%	Press:101kpa

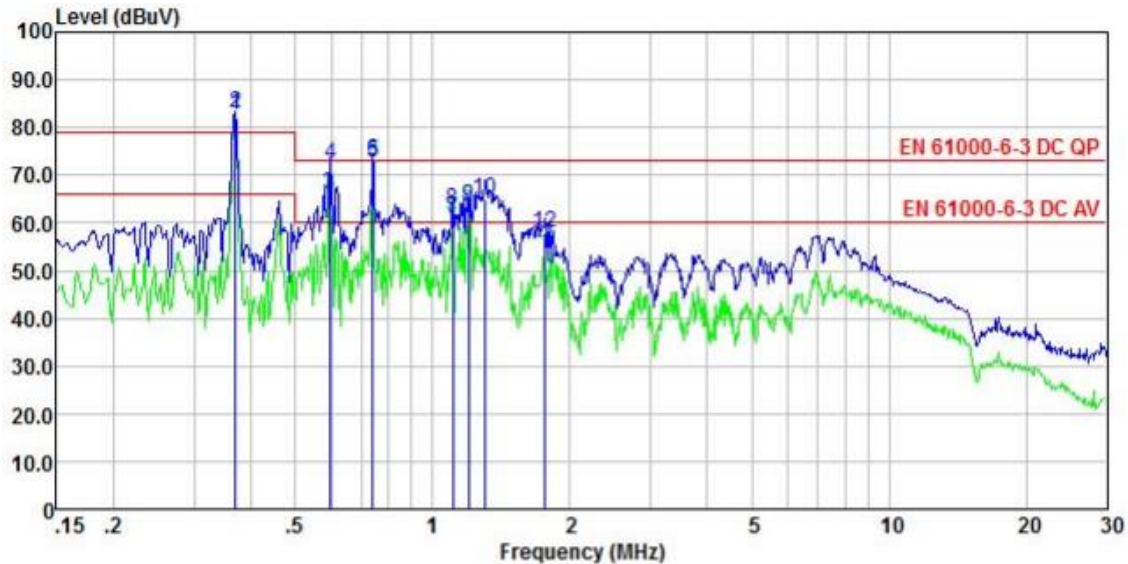


	Freq	Read Level	LISN Factor	Aux Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB	
1 *	0.369	72.45	0.20	0.00	10.50	0.03	83.18	66.00	17.18	Average
2 *	0.369	72.50	0.20	0.00	10.50	0.03	83.23	79.00	4.23	QP
3 *	0.595	57.61	0.20	0.00	10.50	0.02	68.33	60.00	8.33	Average
4 *	0.595	62.40	0.20	0.00	10.50	0.02	73.12	73.00	0.12	QP
5 *	0.739	61.95	0.20	0.00	10.50	0.03	72.68	60.00	12.68	Average
6 *	0.739	62.90	0.20	0.00	10.50	0.03	73.63	73.00	0.63	QP
7	1.106	52.09	0.20	0.00	10.50	0.07	62.86	73.00	-10.14	QP
8 *	1.111	49.75	0.20	0.00	10.50	0.07	60.52	60.00	0.52	Average
9	1.303	46.22	0.20	0.00	10.50	0.11	57.03	60.00	-2.97	Average
10	1.331	53.68	0.20	0.00	10.50	0.12	64.50	73.00	-8.50	QP
11	1.744	45.84	0.20	0.00	10.50	0.18	56.72	73.00	-16.28	QP
12	1.753	44.07	0.20	0.00	10.50	0.18	54.95	60.00	-5.05	Average

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2
Tester by:	Jeremy Lin	Test mode:	1 Port network test(1Gbps)
Test frequency:	150 kHz ~ 30 MHz	Phase:	Negative
Test voltage:	DC 12V	Sample Number	SZR012400273-1
Environment:	Temperature: 24.0°C	Humidity: 50%	Press:101kpa



	Freq	Read Level	LISN Factor	Aux Factor	Aux2 Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB	
1 *	0.369	71.99	0.20	0.00	10.50	0.03	82.72	66.00	16.72	Average
2 *	0.369	72.30	0.20	0.00	10.50	0.03	83.03	79.00	4.03	QP
3 *	0.595	55.21	0.20	0.00	10.50	0.02	65.93	60.00	5.93	Average
4	0.598	61.60	0.20	0.00	10.50	0.02	72.32	73.00	-0.68	QP
5 *	0.739	61.86	0.20	0.00	10.50	0.03	72.59	60.00	12.59	Average
6 *	0.739	62.50	0.20	0.00	10.50	0.03	73.23	73.00	0.23	QP
7 *	1.106	50.03	0.21	0.00	10.50	0.07	60.81	60.00	0.81	Average
8	1.106	52.12	0.21	0.00	10.50	0.07	62.90	73.00	-10.10	QP
9 *	1.197	52.62	0.23	0.00	10.50	0.09	63.44	60.00	3.44	Average
10	1.303	54.18	0.24	0.00	10.50	0.11	65.03	73.00	-7.97	QP
11	1.753	44.90	0.28	0.00	10.50	0.18	55.86	60.00	-4.14	Average
12	1.762	47.02	0.28	0.00	10.50	0.18	57.98	73.00	-15.02	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss.

7 Immunity Test Results

Performance Criteria specified by the client, refer to Description in Clause 8 of EN 55035		
Criterion A:	EN 55035	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function or change of operation state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
	Specified by the client	Data transmission is completely normal or not completely interrupted, regardless of whether there is a decrease in data transmission rate or a large number of errors, even if the rate decreases and errors continue to occur after the test is completed.
Criterion B:	EN 55035	During the test application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
	Specified by the client	Data transmission is completely interrupted (transmission rate drops to zero), but can recover without manual intervention.
Criterion C:	EN 55035	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.
	Specified by the client	Data transmission is completely interrupted (transmission rate drops to zero), but can recover with manual intervention.

7.1 Continuous induced RF disturbances

Test Requirement:	EN 55035
Test Method:	IEC 61000-4-6
Test port:	1) Analogue/digital data/ DC network power ports.
Criterion Required:	A
Equipment Used:	Refer to section 5.10 for details.
Test Setup:	
<p>Figure1. For Analogue/digital data ports</p>	
Test Procedure:	<ol style="list-style-type: none"> 1) Let the EUT work in test mode and test it. 2) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). 3) The coupling and decoupling devices were required, they were located between 0.1 m and 0.3 m from the EUT. This distance was to be measured horizontally from the projection of the EUT on to the ground reference plane to the coupling and decoupling device. 4) Each AE, used with clamp injection, shall be placed on an insulating support 0.1 m above the ground reference plane. A decoupling network shall be installed on each cable between the EUT and AE except the cable under test. All cables connected to each AE, other than those being connected to the EUT, shall be provided with decoupling networks. The decoupling networks connected to each AE (except those on cables between the EUT and AE) shall be applied no further than 0.3 m from the AE. The cable(s) between the AE and the decoupling network (s) or in between the AE and the injection clamp shall not be bundled nor wrapped and shall be kept between 30 mm and 50 mm above the ground reference plane 5) The frequency range is swept from 0.15MHz to 80MHz using 3V to 1V signal level and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep shall not exceed $1.5 \cdot 10^{-3}$ decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value. 6) The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. Sensitive frequency e.g clock frequency and harmonics or frequencies of dominant interest shall be analyzed separately. However, the dwell time should not exceed 5 s at each of the frequencies during the scan. 7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.
Test result:	PASS

Measurement Record:

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2
Tester by:	<i>Carl Wong</i>	Test mode:	2 Port network test(1Gbps)
Test voltage:	DC 12V	Sample Number	SZR012400273-1
Environment:	Temperature: 24.3°C	Humidity: 49%	Press:101kpa

Frequency	Injected Position	Test Level	Modulation	Step Size	Dwell Time	Performance Criterion	Observations	Result
150kHz to 10MHz	Network ports	3V	80%, 1kHz Amp. Mod.	1%	2s	A	A ₁	Pass
10MHz to 30MHz		3V to1V				A	A ₁	Pass
30MHz to 80MHz		1V				A	A ₁	Pass

Remark:

A₁: During and after the test, EUT worked normally, data transmission is completely normal, no obvious phenomenon observed.

Analogue/digital data / DC network power ports cable lengths greater than 3 m.

7.2 Electrical Fast Transients (EFT)

Test Requirement:	EN 55035
Test Method:	IEC 61000-4-4
Test Level:	1) $\pm 0.5\text{kV}$ 5/50 ns 5kHz on analogue/digital data ports
Polarity:	Positive & Negative
Criterion Required:	A
Repetition Frequency:	5kHz (For CPE xDSL ports repetition frequency is 100kHz)
Burst Period:	300ms
Test Duration:	2 minute per level & polarity
Equipment Used:	Refer to section 5.10 for details.
Test Setup:	

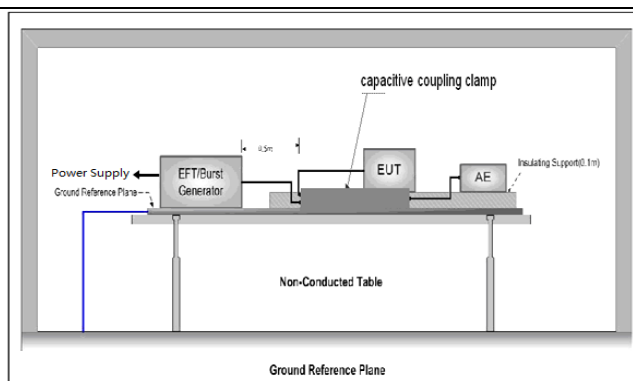


Figure 1. For analogue/digital data port

Test Procedure:	<ol style="list-style-type: none"> 1) The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP. 2) The GRP shall project beyond the EUT and the clamp by at least 0.1m on all sides. The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m. All cables to the EUT was placed on the insulation support 0.1m above GRP. A cable not subject to EFT was routed as far as possible from cable under test to minimize the coupling between the cables. 3) The length of signal and power cable between the EUT and EFT generator was 0.5m. If the cable is a non-detachable supply cable more than 0.5m, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1m above the GRP. 4) The EUT was conducted the below specified test voltages for line and neutral or line, neutral and earth simultaneously (for telecommunication, single, control and DC port line with capacitive coupling clamp), 120 seconds duration. If the equipment contains identical ports, only one was tested; multicomputer cables, such as a 50-pair telecommunication cable, were tested as a single cable. Cables did not be split or divided into groups of conductors for this test; interface ports, which were intended by the manufacturer to be connected to data cables not longer than 3 m, did not be tested.
Test result:	FAIL

Measurement Record:

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2		
Tester by:	<i>Carl Wang</i>	Test mode:	2 Port network test(1Gbps)		
Test voltage:	DC 12V	Sample Number	SZR012400273-1		
Environment:	Temperature: 24.3°C	Humidity: 49%	Press:101kpa		
Lead under Test	Level (kV)	Coupling Direct/Clamp	Performance Criterion	Observations	Result
Network ports	±0.5	Clamp	B	C ₁	Fail
<p>Remark:</p> <p>C₁: During the test, EUT data transmission completely interrupted (transmission rate dropped to zero, which normal maximum rate is 1000Mbps/s). After the test, EUT could recover with manual intervention.</p> <p><i>Analogue/digital data /DC network power ports cable lengths greater than 3 m.</i></p> <p><i>The test line used in the test is a 10m shielded line.</i></p>					

7.3 Power frequency magnetic field

Test Requirement:	EN 55035
Test Method:	EN61000-4-8
Test Frequency:	50/60 Hz
Test Level:	1 A/m
Performance Criterion:	Criteria A
Test setup:	
Test Procedure:	<ol style="list-style-type: none"> 1) The EUT place centre of the test magnetic field coils. 2) The plane of the inductive coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations. 3) The signal generator generates a magnetic field of 1A/m for testing.
Test Instruments:	Refer to section 5.10 for details
Test results:	Pass

Measurement Record:

Product name:	GigaBlox Rugged	Product model:	BB-GGR-C-2
Tester by:	<i>Carl Wang</i>	Test mode:	1 Port network test(1Gbps)
Test voltage:	DC 12V	Sample Number	SZR012400273-1
Environment:	Temperature: 24.8°C	Humidity: 42%	Press:101kpa

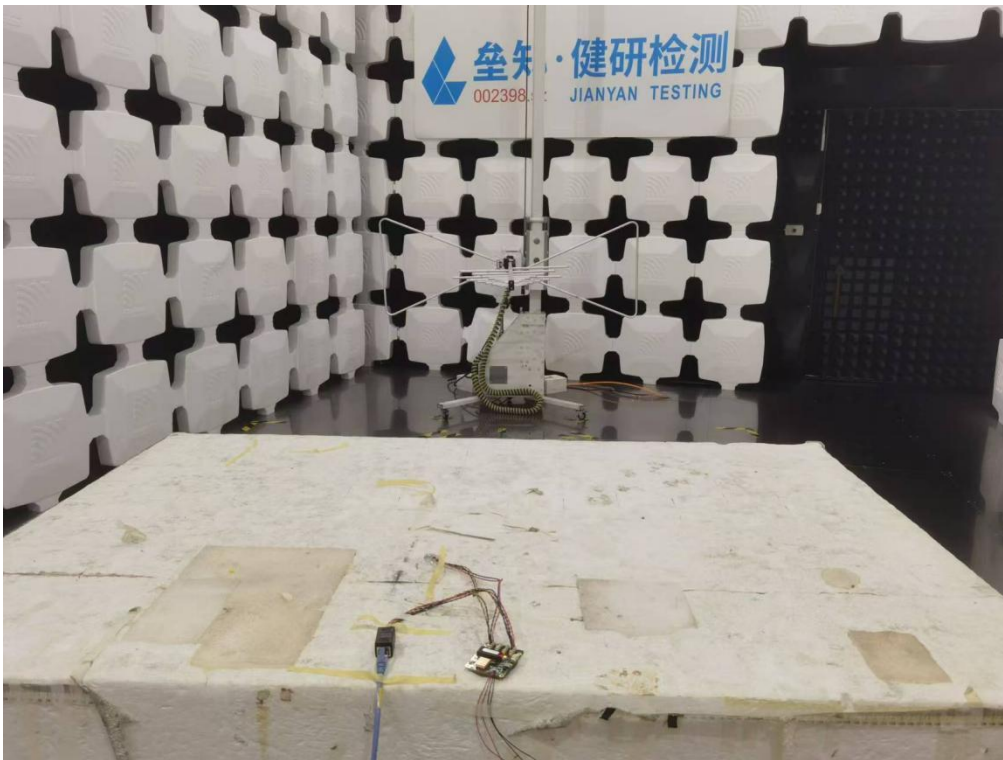
Test Frequency (Hz)	Power frequency magnetic field	Coil orientation	Performance Criterion	Observations	Result
50/60 Hz	1 A/m	X-axis	A	A ₁	Pass
50/60 Hz	1 A/m	Y-axis	A	A ₁	Pass
50/60 Hz	1 A/m	Z-axis	A	A ₁	Pass

Remark:

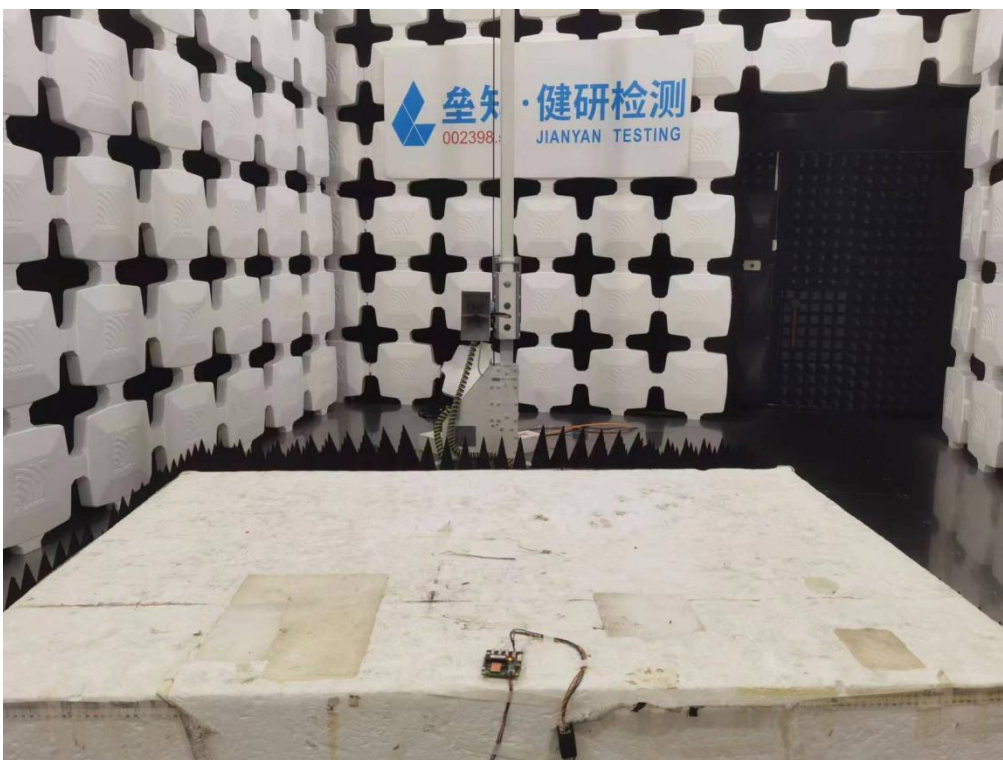
A₁: During and after the test, EUT worked normally, data transmission was not interrupted, no obvious phenomenon observed.

8 PHOTOGRAPHS OF TEST SETUP

Test mode No.: BB-GGR-C-2



Radiated emission Test Setup-1(30MHz~1GHz)



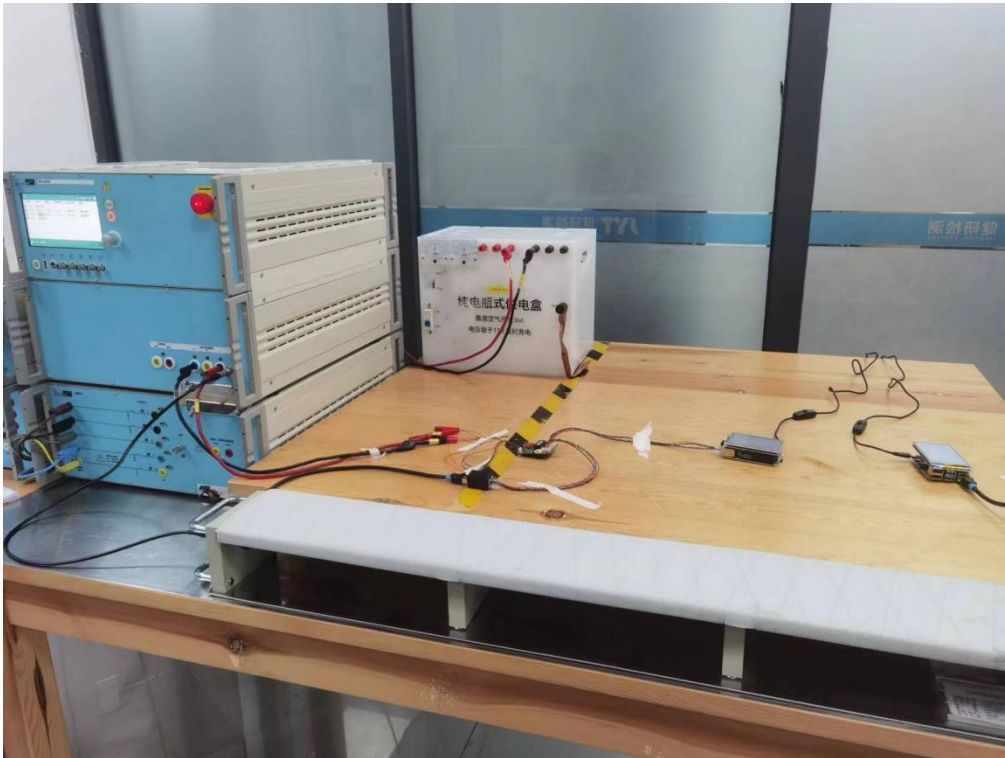
Radiated emission Test Setup-2(Above 1GHz)



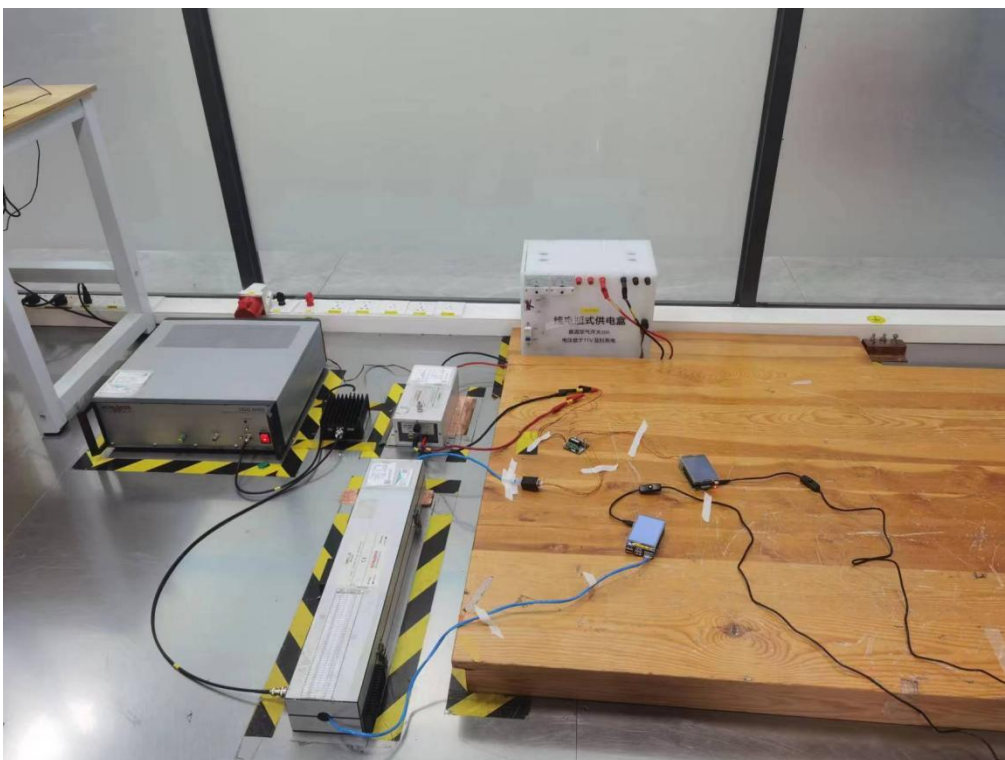
Conducted emission (DC power port) Test Setup



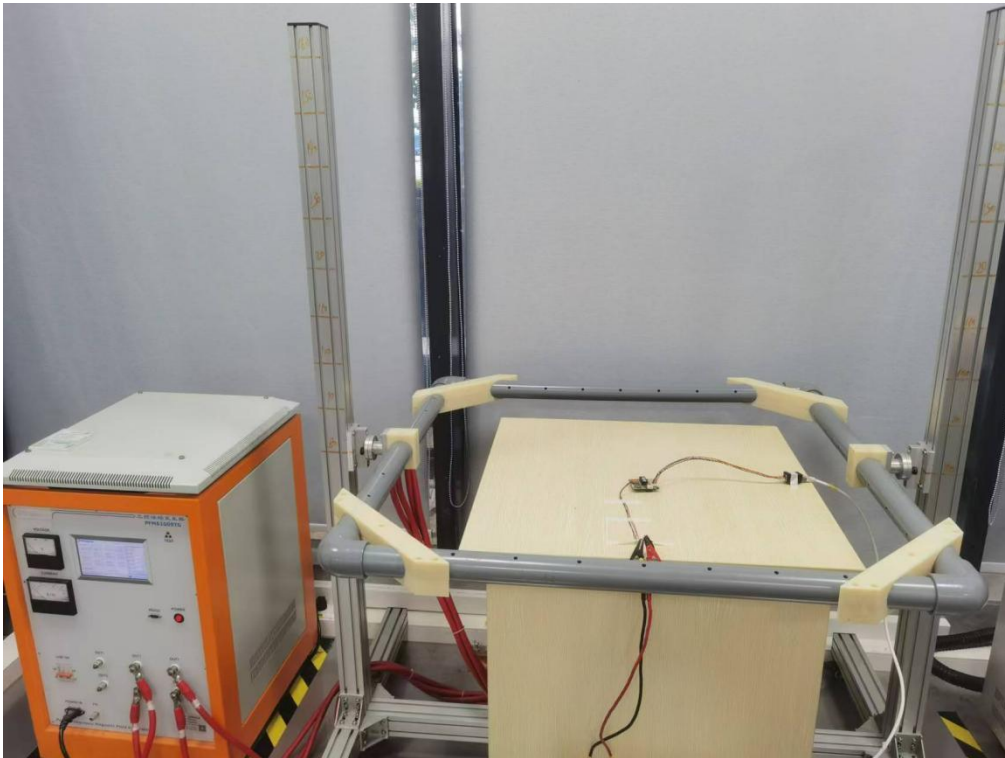
Conducted emission (Network port) Test Setup



Fast transients common mode Test Setup



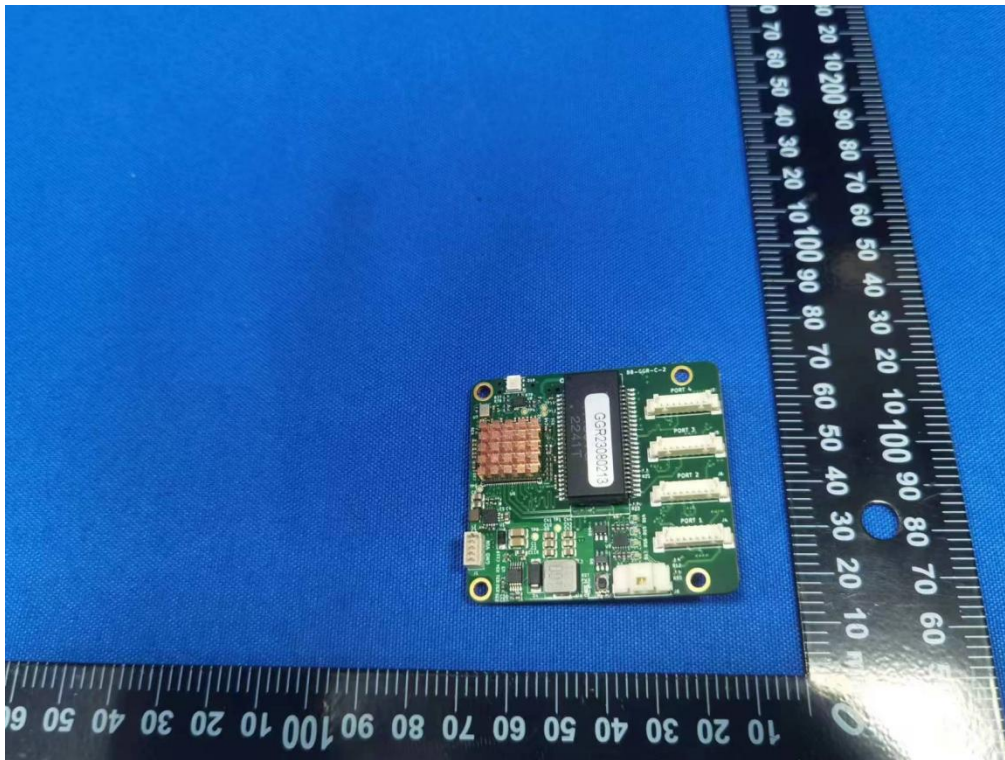
RF common mode Test Setup



Power frequency magnetic field Test Setup

9 EUT Constructional Details

Test mode No.: BB-GGR-C-2



View of General Product-1



View of General Product-2

-----End of report-----