

FCC Report

Applicant: Grand Electronics, INC
Address of Applicant: 11650 Brentcross Dr, 11650, Tomball, Texas 77377, United States
Manufacturer: Shenzhen BAKER Electronics Co.LTD
Address of Manufacturer: 6/F.A.Building, The first industrial area of Fenghuang, Fuyong, Bao'an, Shenzhen, China

Equipment Under Test (EUT)

Product Name: Sports DV
Model No.: LY1-DVS, LY2-DVS, Xtrem-SN, Xtrem-LY
Trade Mark: neutab.
FCC ID: 2AGNK-LYDV1
Applicable standards: FCC CFR Title 47 Part 15 Subpart B:2016
Date of sample receipt: May 13, 2017
Date of Test: May 13-16, 2017
Date of report issue: May 17, 2017
Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

A circular stamp for GTS Global Testing Services Co., Ltd. is overlaid with a handwritten signature in blue ink. The stamp contains the text 'GTS GLOBAL TESTING SERVICES CO., LTD.' around the perimeter and 'GTS GLOBAL TESTING' in the center.

Robinson Lo

Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
01	May 17, 2017	Original

Prepared By: Tiger Chen **Date:** May 17, 2017
Project Engineer

Check By: Andy Wu **Date:** May 17, 2017
Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part15.107	PASS
Radiated Emissions	Part15.109	PASS

PASS: The EUT complies with the essential requirements in the standard.

Remark : Test according to ANSI C63.4:2014.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	Sports DV
Model No.:	LY1-DVS, LY2-DVS, Xtre-SN, Xtrem-LY
Test Model No.:	LY1-DVS
<i>Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is the model name for commercial purpose.</i>	
Power Supply:	DC 3.7V, 1000mAh, 3.7Wh Li-ion battery

5.2 Test mode

Test mode:	
PC mode	Keep the EUT in exchange data status with PC.
REC mode	Keep the EUT in video record mode.
HDMI mode	Keep the EUT in video playing and HDMI output mode.
Take photo mode	Keep the EUT in taking photos.

5.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.5 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
DELL	KEYBOARD	SK-8115	N/A	DOC
DELL	MOUSE	N/A	N/A	DOC
Apple	PC	A1278	C1MN99ERDTY3	DOC
DELTA	ADAPTER	ADP-60ADT	N/A	DoC

5.6 Deviation from Standards

Biconical, log.per. antenna and horn antenna were used instead of dipole antenna. Semi-anechoic Chamber was used as alternation of open air test sites, and all test suites were performed with radiated method in it.

5.7 Abnormalities from Standard Conditions

None.

5.8 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 03 2015	July 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June 29 2016	June 28 2017
4	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 29 2016	June 28 2017
5	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 29 2016	June 28 2017
6	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2016	June 28 2017
7	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 29 2016	June 28 2017
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Coaxial Cable	GTS	N/A	GTS213	June 29 2016	June 28 2017
10	Coaxial Cable	GTS	N/A	GTS211	June 29 2016	June 28 2017
11	Coaxial cable	GTS	N/A	GTS210	June 29 2016	June 28 2017
12	Coaxial Cable	GTS	N/A	GTS212	June 29 2016	June 28 2017
13	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 29 2016	June 28 2017
14	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 29 2016	June 28 2017
15	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2016	June 28 2017
16	Band filter	Amindeon	82346	GTS219	June 29 2016	June 28 2017
17	Power Meter	Anritsu	ML2495A	GTS540	June 29 2016	June 28 2017
18	Power Sensor	Anritsu	MA2411B	GTS541	June 29 2016	June 28 2017

Conducted Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 29 2016	June. 28 2017
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 29 2016	June. 28 2017
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 29 2016	June. 28 2017
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 29 2016	June. 28 2017

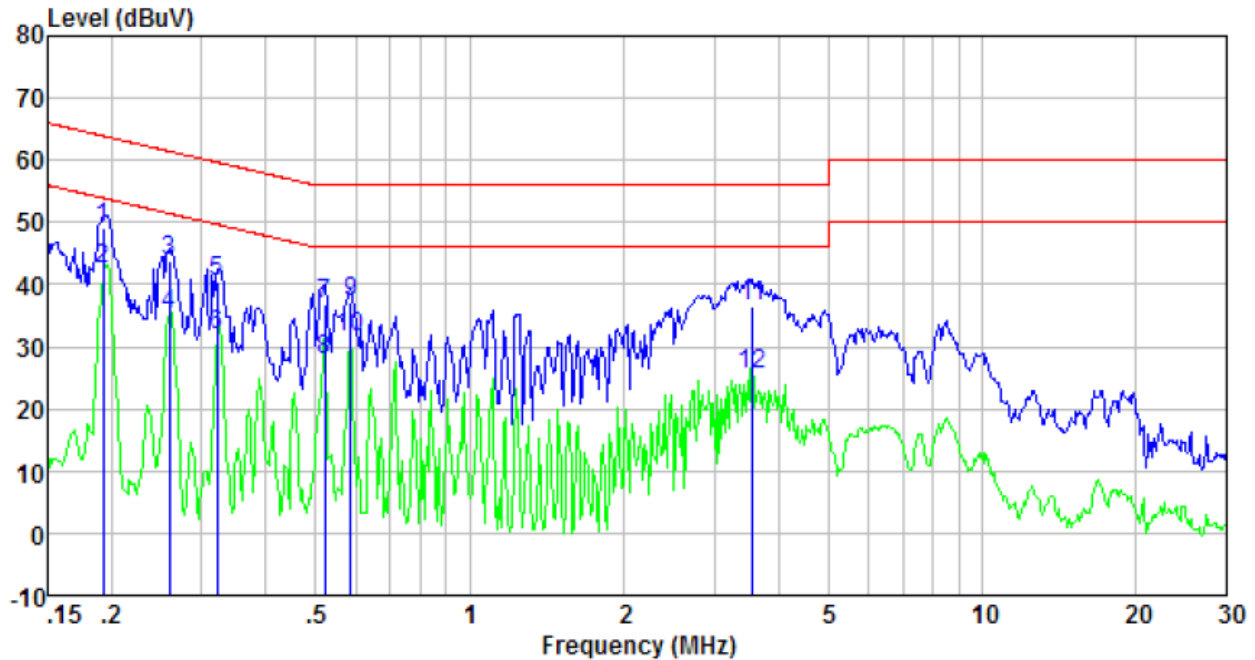
7 Test Results and Measurement Data

7.1 Conducted Emissions

Test Requirement:	FCC Part15 B Section 15.107														
Test Method:	ANSI C63.4:2014														
Test Frequency Range:	150KHz to 30MHz														
Class / Severity:	Class B														
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto														
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test setup:	<p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement. 														
Test Instruments:	Refer to section 6 for details														
Test mode:	Refer to section 5.2 for details, and found the PC mode which is the worst mode, so only the data of worst mode was show on the test report.														
Test results:	Pass														

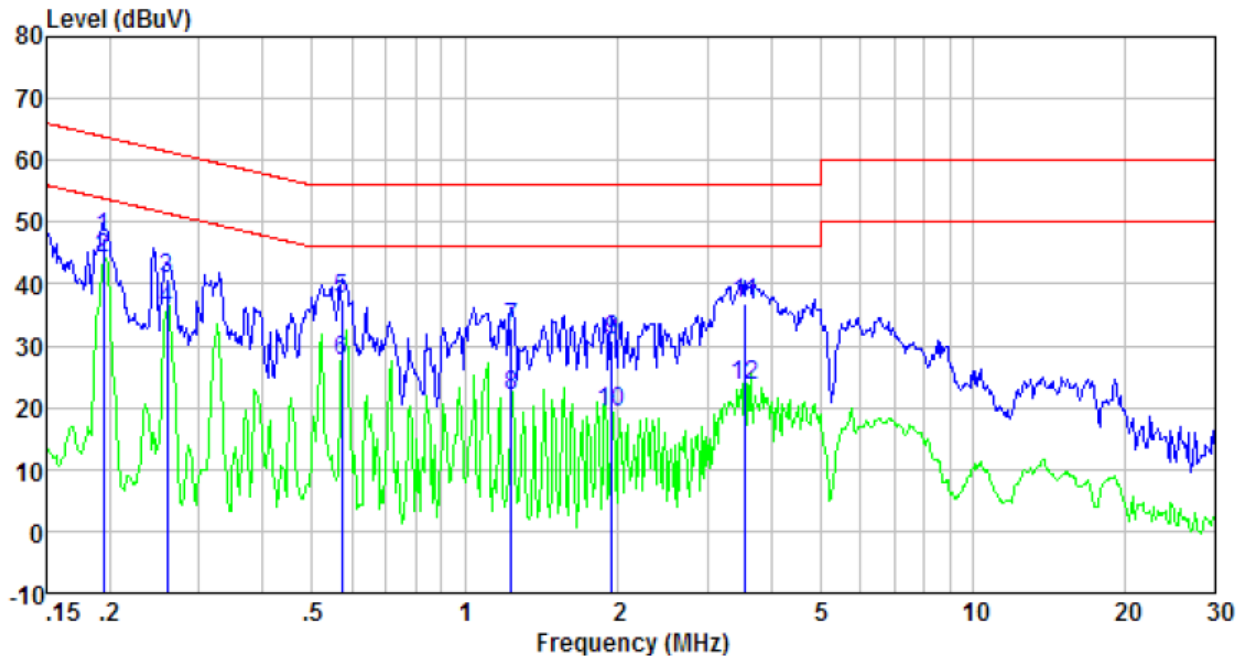
Measurement Data

Test mode:	PC mode	Phase Polarity:	Line
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Freq MHz	Reading level dBuV	IISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.192	48.56	0.43	0.13	49.12	63.93	-14.81	QP
0.192	41.79	0.43	0.13	42.35	53.93	-11.58	Average
0.259	43.12	0.44	0.11	43.67	61.47	-17.80	QP
0.259	34.71	0.44	0.11	35.26	51.47	-16.21	Average
0.322	39.84	0.43	0.10	40.37	59.66	-19.29	QP
0.322	31.20	0.43	0.10	31.73	49.66	-17.93	Average
0.521	36.35	0.37	0.11	36.83	56.00	-19.17	QP
0.521	27.54	0.37	0.11	28.02	46.00	-17.98	Average
0.585	36.58	0.32	0.12	37.02	56.00	-18.98	QP
0.585	31.09	0.32	0.12	31.53	46.00	-14.47	Average
3.565	36.00	0.21	0.15	36.36	56.00	-19.64	QP
3.565	25.10	0.21	0.15	25.46	46.00	-20.54	Average

Test mode:	PC mode	Phase Polarity:	Neutral
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Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.194	46.77	0.41	0.13	47.31	63.84	-16.53	QP
0.194	43.61	0.41	0.13	44.15	53.84	-9.69	Average
0.259	40.30	0.42	0.11	40.83	61.47	-20.64	QP
0.259	35.32	0.42	0.11	35.85	51.47	-15.62	Average
0.573	36.92	0.29	0.12	37.33	56.00	-18.67	QP
0.573	27.00	0.29	0.12	27.41	46.00	-18.59	Average
1.236	32.62	0.21	0.13	32.96	56.00	-23.04	QP
1.236	21.63	0.21	0.13	21.97	46.00	-24.03	Average
1.949	30.40	0.20	0.14	30.74	56.00	-25.26	QP
1.949	18.97	0.20	0.14	19.31	46.00	-26.69	Average
3.565	36.47	0.21	0.15	36.83	56.00	-19.17	QP
3.565	23.09	0.21	0.15	23.45	46.00	-22.55	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
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.2 Radiated Emission

Test Requirement:	FCC Part15 B Section 15.109																							
Test Method:	ANSI C63.4:2014																							
Test Frequency Range:	30MHz to 25GHz																							
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																							
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>120kHz</td> <td>300kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td rowspan="2">Above 1GHz</td> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak Value</td> </tr> <tr> <td>Peak</td> <td>1MHz</td> <td>10Hz</td> <td>Average Value</td> </tr> </tbody> </table>				Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	10Hz	Average Value	
Frequency	Detector	RBW	VBW	Remark																				
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value																				
Above 1GHz	Peak	1MHz	3MHz	Peak Value																				
	Peak	1MHz	10Hz	Average Value																				
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBuV/m @3m)</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>30MHz-88MHz</td> <td>40.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td>88MHz-216MHz</td> <td>43.50</td> <td>Quasi-peak Value</td> </tr> <tr> <td>216MHz-960MHz</td> <td>46.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td>960MHz-1GHz</td> <td>54.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td rowspan="2">Above 1GHz</td> <td>54.00</td> <td>Average Value</td> </tr> <tr> <td>74.00</td> <td>Peak Value</td> </tr> </tbody> </table>				Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.00	Quasi-peak Value	88MHz-216MHz	43.50	Quasi-peak Value	216MHz-960MHz	46.00	Quasi-peak Value	960MHz-1GHz	54.00	Quasi-peak Value	Above 1GHz	54.00	Average Value	74.00	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																						
30MHz-88MHz	40.00	Quasi-peak Value																						
88MHz-216MHz	43.50	Quasi-peak Value																						
216MHz-960MHz	46.00	Quasi-peak Value																						
960MHz-1GHz	54.00	Quasi-peak Value																						
Above 1GHz	54.00	Average Value																						
	74.00	Peak Value																						
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 																							
Test setup:	Below 1GHz																							

	<p>Above 1GHz</p>
Test environment:	Temp.: 25 °C Humid.: 52% Press.: 1 012mbar
Measurement Record:	Uncertainty: ± 4.5dB
Test Instruments:	Refer to section 6 for details
Test mode:	Refer to section 5.2 for details, and found the PC mode which is the worst mode, so only the data of worst mode was show on the test report.
Test results:	Pass

Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

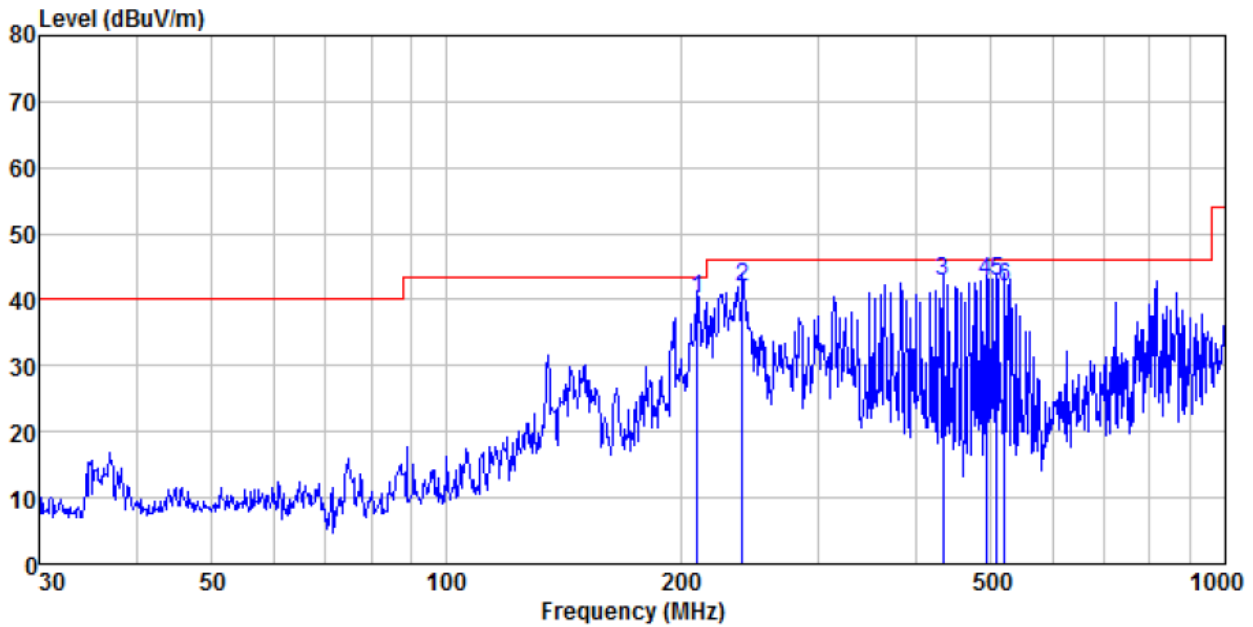
$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

For above 1GHz test, 1GHz to 25GHz all have been tested, only worse case 1GHz to 6GHz is reported, from 6GHz to 25GHz, no emission is found

Measurement Data

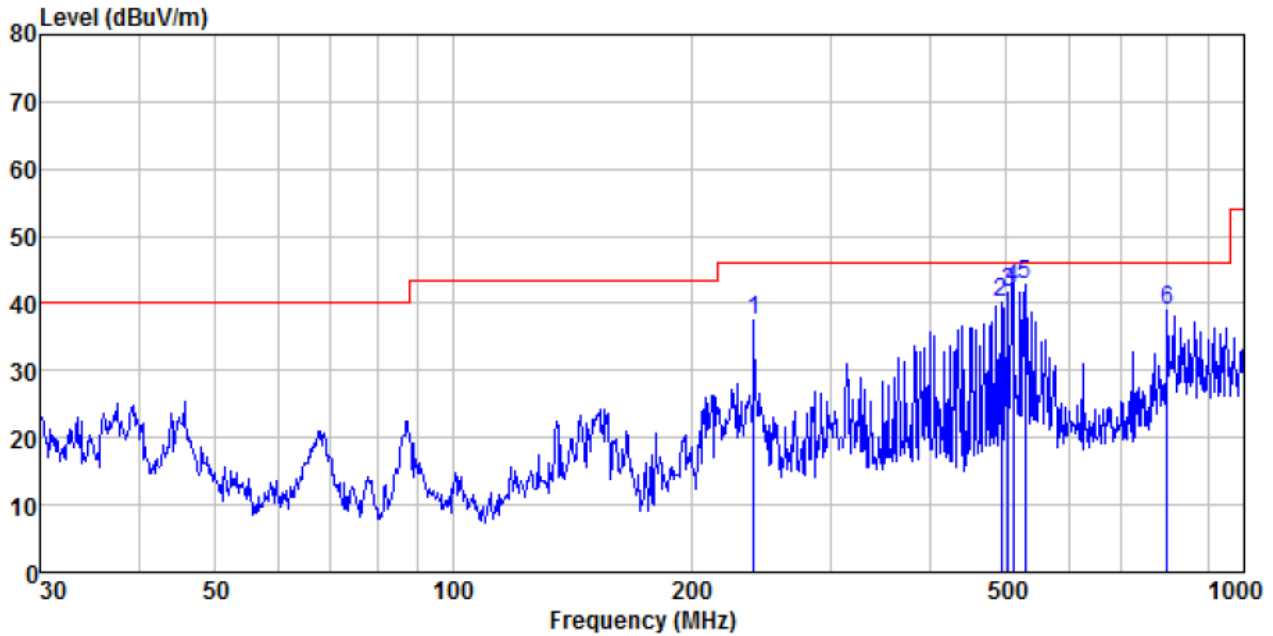
Below 1GHz

Test mode:	PC mode	Antenna Polarity:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
210.048	57.07	10.59	1.90	29.30	40.26	43.50	-3.24	QP
239.987	57.94	11.56	2.07	29.56	42.01	46.00	-3.99	QP
434.065	53.05	16.17	3.02	29.43	42.81	46.00	-3.19	QP
492.469	51.48	17.38	3.27	29.32	42.81	46.00	-3.19	QP
508.258	51.01	17.66	3.34	29.30	42.71	46.00	-3.29	QP
520.888	50.06	17.87	3.39	29.30	42.02	46.00	-3.98	QP

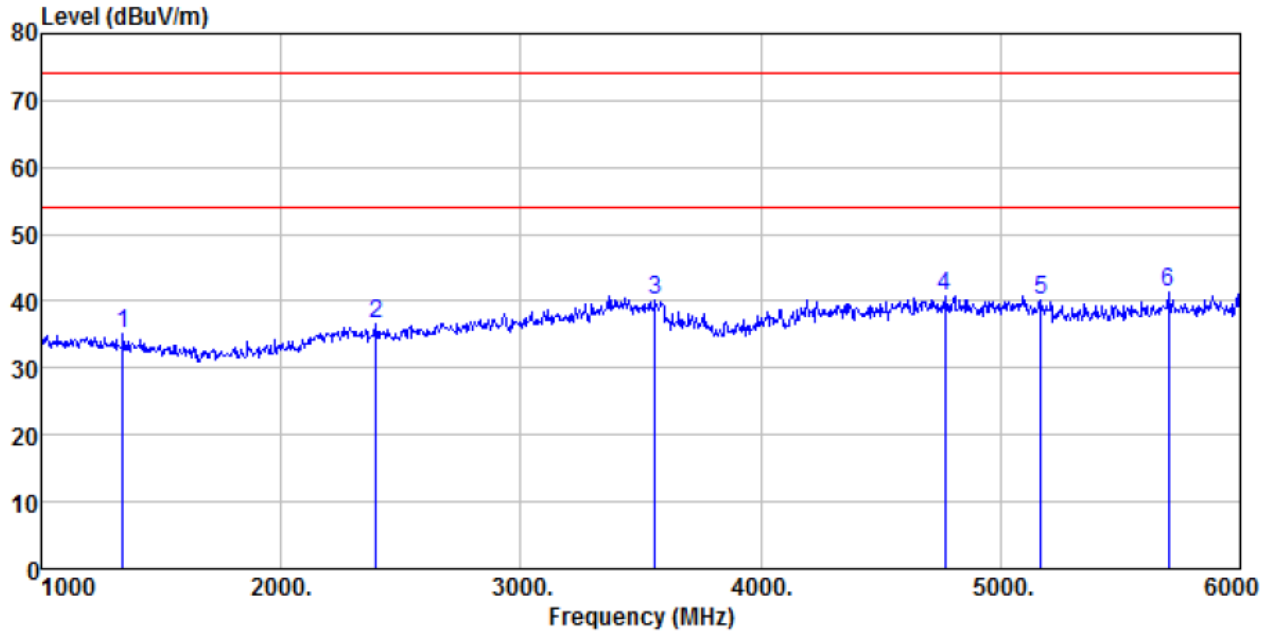
Test mode:	PC mode	Antenna Polarity:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
239.987	53.44	11.56	2.07	29.56	37.51	46.00	-8.49	QP
492.469	48.76	17.38	3.27	29.32	40.09	46.00	-5.91	QP
502.940	50.19	17.55	3.32	29.30	41.76	46.00	-4.24	QP
510.044	50.33	17.71	3.35	29.30	42.09	46.00	-3.91	QP
528.246	50.74	18.03	3.43	29.30	42.90	46.00	-3.10	QP
798.980	42.44	21.30	4.45	29.20	38.99	46.00	-7.01	QP

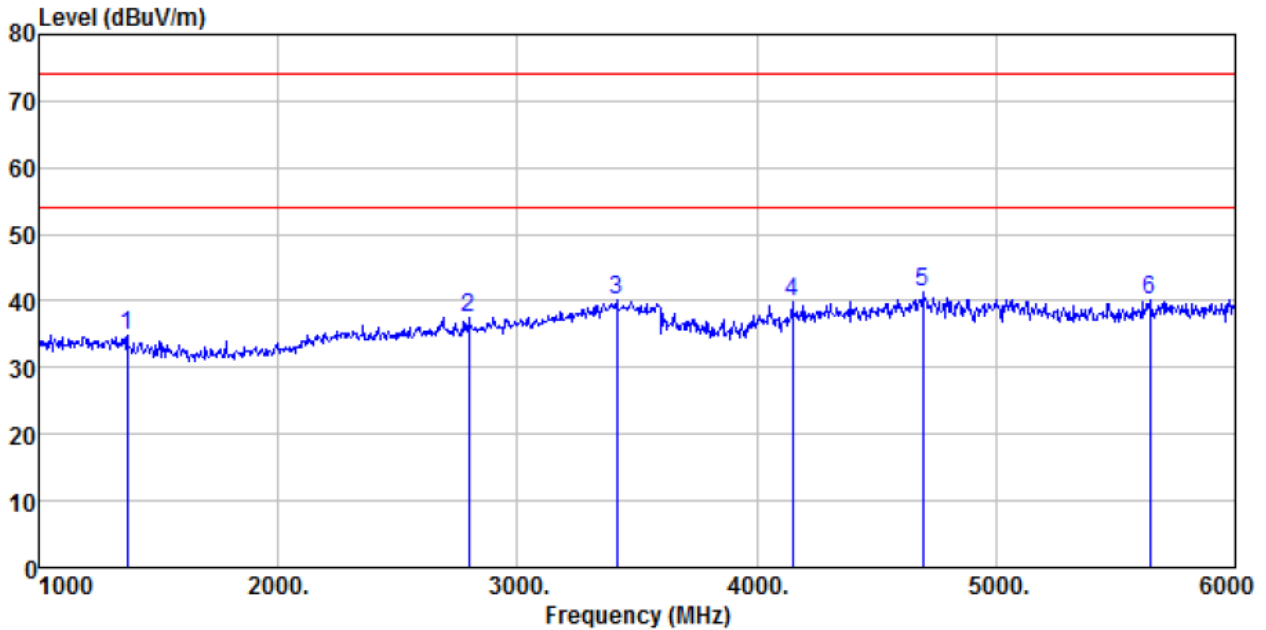
Above 1GHz

Test mode:	PC mode	Antenna Polarity:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1340.000	38.26	25.69	4.57	33.33	35.19	74.00	-38.81	Peak
2395.000	37.66	27.59	5.39	34.01	36.63	74.00	-37.37	Peak
3560.000	36.53	29.09	7.07	32.67	40.02	74.00	-33.98	Peak
4770.000	32.56	31.73	8.58	32.07	40.80	74.00	-33.20	Peak
5170.000	31.34	32.04	9.01	32.26	40.13	74.00	-33.87	Peak
5700.000	31.30	32.50	9.79	32.31	41.28	74.00	-32.72	Peak

Test mode:	PC mode	Antenna Polarity:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1370.000	37.88	25.66	4.59	33.39	34.74	74.00	-39.26	Peak
2795.000	36.96	28.40	5.76	33.55	37.57	74.00	-36.43	Peak
3415.000	37.44	28.67	6.80	32.85	40.06	74.00	-33.94	Peak
4150.000	33.67	30.06	8.01	32.01	39.73	74.00	-34.27	Peak
4695.000	33.19	31.65	8.51	32.03	41.32	74.00	-32.68	Peak
5645.000	30.52	32.36	9.72	32.35	40.25	74.00	-33.75	Peak

8 Test Setup Photo

Radiated Emission



Conducted Emission



9 EUT Constructional Details

Reference to the test report No. GTS201704000138E01

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