

FCC PART 15B

TEST REPORT

For

Shanghai Muge Technology Co., Ltd.

J,building 1, No.2222, Huancheng Road, Jiading District, Shanghai, China 201899

FCC ID:2AXN4GM01

Report Type: Original Report	Product Type: GS Series
Report Number:	RBJ200907050-00
Report Date:	2020-09-29
Reviewed By:	Sky Lu EMC Engineer <i>Sky.Lu</i>
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

TABLE OF CONTENTS

General Information	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S)	3
TEST METHODOLOGY	3
MEASUREMENT UNCERTAINTY	4
TEST FACILITY.....	4
DECLARATIONS	4
System Test Configuration	5
DESCRIPTION OF TEST CONFIGURATION	5
EQUIPMENT MODIFICATIONS	5
EUT EXERCISE SOFTWARE	5
BLOCK DIAGRAM OF TEST SETUP.....	5
SUPPORT EQUIPMENT LIST AND DETAILS	6
SUPPORT CABLE LIST AND DETAILS	6
TEST EQUIPMENT LIST	7
ENVIRONMENTAL CONDITIONS.....	7
Summary of Test Results	8
1 – Conducted emissions	9
EUT SETUP.....	9
EMI TEST RECEIVER SETUP	9
TEST PROCEDURE	10
CORRECTED AMPLITUDE & MARGIN CALCULATION	10
TEST DATA	11
2 – Radiated emissions	13
EUT SETUP.....	13
EMI TEST RECEIVER SETUP	14
TEST PROCEDURE	14
CORRECTED AMPLITUDE & MARGIN CALCULATION	14
TEST DATA	15

GENERAL INFORMATION**Product Description for Equipment under Test (EUT)**

EUT Name:	GS Series
EUT Model:	GM01
Multiple Models:	N/A
Rated Input Voltage:	DC 12V
The Highest Operating Frequency:	2.7GHz
I/O Ports:	HDMI Port, BNC Port, USB Port, RJ45 Port, DC Port
EUT Function:	Video Decoding
Serial Number:	RBJ200907050-EM-S1
EUT Received Date:	2020/9/22
EUT Received Status:	Good

Objective

This report is prepared on behalf of **Shanghai Muge Technology Co., Ltd.** in accordance with Part 2, Part J, and Part 15, Subpart A and B of the Federal Communications Commission's rules..

The objective is to determine the compliance of EUT with:
FCC Part 15B Class B

Related Submittal(s)/Grant(s)

No related submittal.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

Measurement Uncertainty

Parameter	Measurement Uncertainty
Unwanted Emissions, radiated	30M~200MHz: 4.55 dB, 200M~1GHz: 5.92 dB, 1G~6GHz: 4.98 dB, 6G~18GHz: 5.89 dB, 18G~26.5G: 5.47 dB, 26.5G~40G: 5.63 dB
Temperature	±1 °C
Humidity	±5%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier : CN0022.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol “△”. Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

This report cannot be reproduced except in full, without prior written approval of the Company.

This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA, or any agency of the U.S. Government.

This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk “★”.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

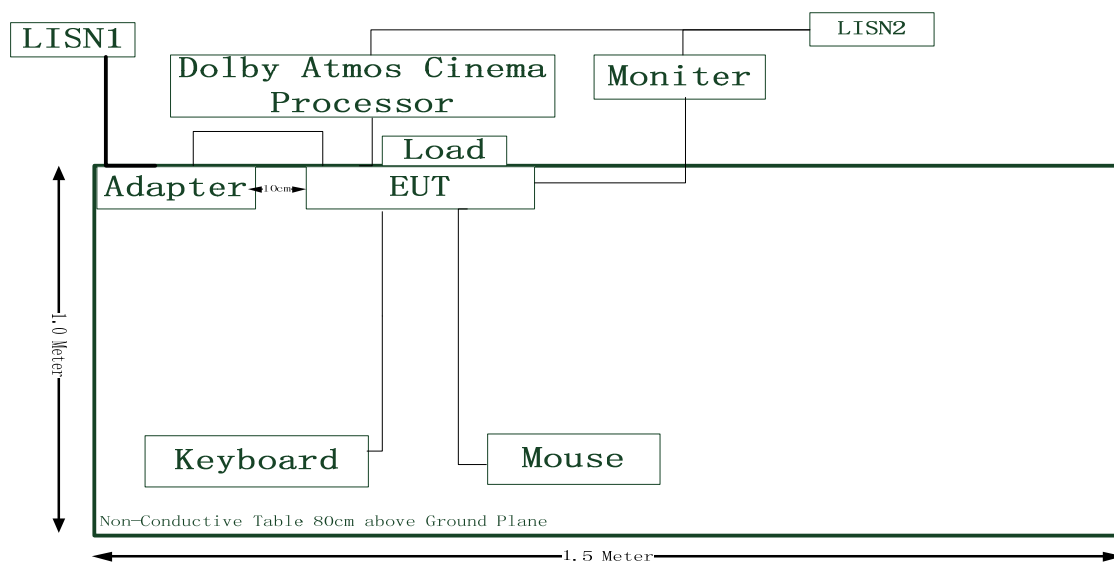
Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

No EUT software was used for testing.

Block Diagram of Test Setup



Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Mouse	MO56UOA	F0Y02P7Y
LG	Keyboard	GL-210	N/A
DELL	Monitor	U3011t	CN-OPH5NY-74445-17M-114L
Dolby	Dolby Atmos Cinema Processor	CP850	N/A
N/A	Load*4	50Ω	N/A
HuntKey	Adapter	HKA06012050-7F	Y60H2J2013004343

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
USB Cable	Yes	No	1.8	EUT	Mouse
USB Cable	Yes	No	1.6	EUT	Keyboard
HDMI Cable	Yes	No	1.8	EUT	Monitor
RJ45 Cable*2	Yes	No	2.0	EUT	Dolby Atmos Cinema Processor
Power Cable	Yes	No	1.5	EUT	Adapter

Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission					
R&S	LISN	ENV 216	101614	2020-09-12	2021-09-12
R&S	EMI Test Receiver	ESCI	101121	2020-07-07	2021-07-07
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2020-09-05	2021-09-05
R&S	Test Software	EMC32	Version 9.10.00	N/A	N/A
Radiated emissions below 1GHz					
Sunol Sciences	Antenna	JB3	A060611-2	2020-08-25	2023-08-25
R&S	EMI Test Receiver	ESCI	100224	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2020-09-23	2021-09-23
Sonoma	Amplifier	310N	185914	2019-10-13	2020-10-13
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiated emissions above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Agilent	Spectrum Analyzer	E4440A	SG43360054	2020-07-07	2021-07-07
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2020-09-05	2021-09-05
Mini-Circuit	Amplifier	ZVA-213-S+	54201245	2020-09-05	2021-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

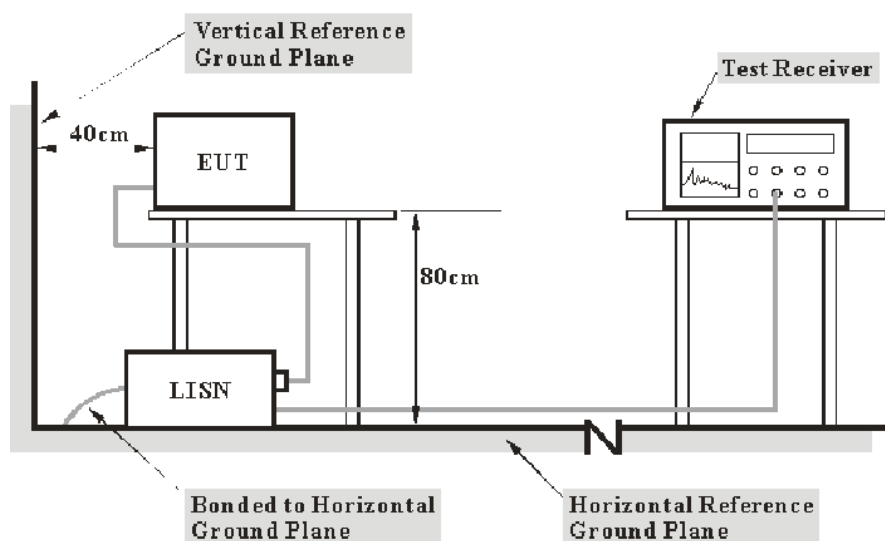
Temperature:	24.5~29 °C
Relative Humidity:	36~51%
ATM Pressure:	100.6kPa
Tester:	Barry Yang, Jackson Zhang, Felix Wang
Test Date:	2020.09.24

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	FCC §15.107	Conducted emissions	Compliance
2	FCC §15.109	Radiated emissions	Compliance

1 - CONDUCTED EMISSIONS

EUT Setup



Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result (QuasiPeak or Average) = Meter Reading + Corr.

Note:

Corr. = Cable loss + Factor of coupling device

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

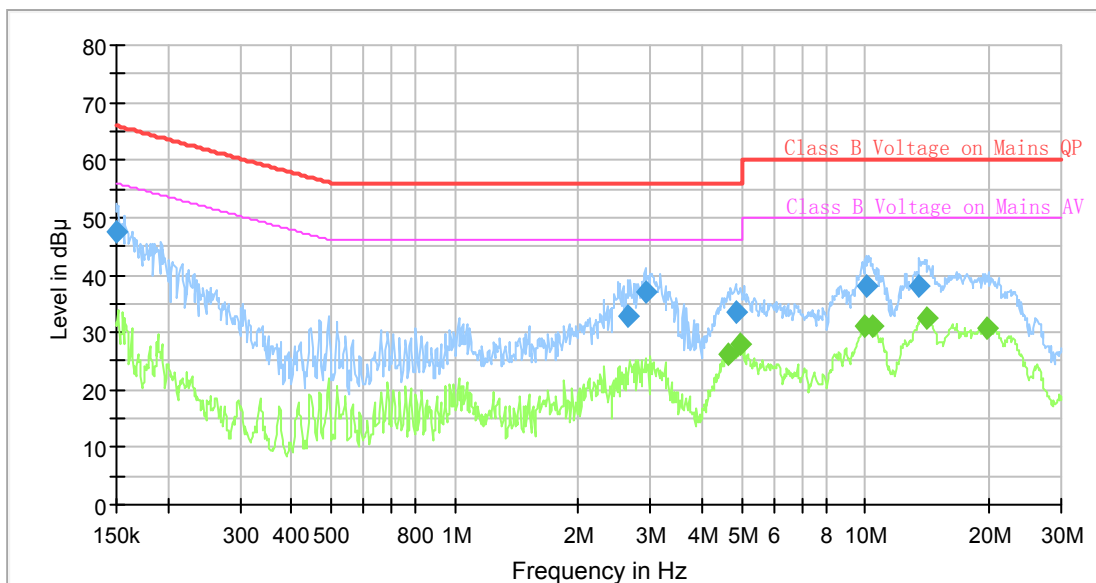
Margin = Limit – Result

Note: Except for the recorded frequency points (no more than 6), the remaining frequency points have a margin more than 20dB.

Test Data

Please refer to following table and plots:

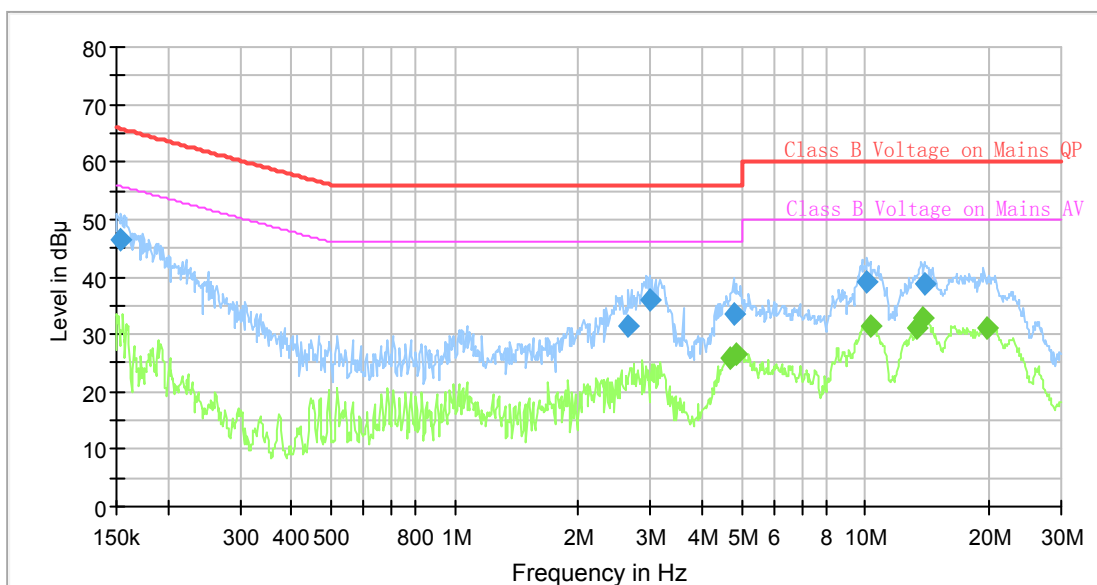
Model Number: GM01
Port: L
Test Mode: Normal Work
Power Source: AC 120V/60Hz
Note:



Final Result

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	47.34	---	66.00	18.66	9.000	L1	9.6
2.653034	32.68	---	56.00	23.32	9.000	L1	9.7
2.916742	37.00	---	56.00	19.00	9.000	L1	9.7
4.661308	---	26.06	46.00	19.94	9.000	L1	9.7
4.826922	33.68	---	56.00	22.32	9.000	L1	9.7
4.973551	---	27.81	46.00	18.19	9.000	L1	9.7
9.998049	---	30.97	50.00	19.03	9.000	L1	9.9
10.048039	37.99	---	60.00	22.01	9.000	L1	9.9
10.405040	---	30.92	50.00	19.08	9.000	L1	9.9
13.553299	38.08	---	60.00	21.92	9.000	L1	10.1
14.175539	---	32.48	50.00	17.52	9.000	L1	10.1
19.800024	---	30.84	50.00	19.16	9.000	L1	10.0

Model Number: GM01
Port: N
Test Mode: Normal Work
Power Source: AC 120V/60Hz
Note:



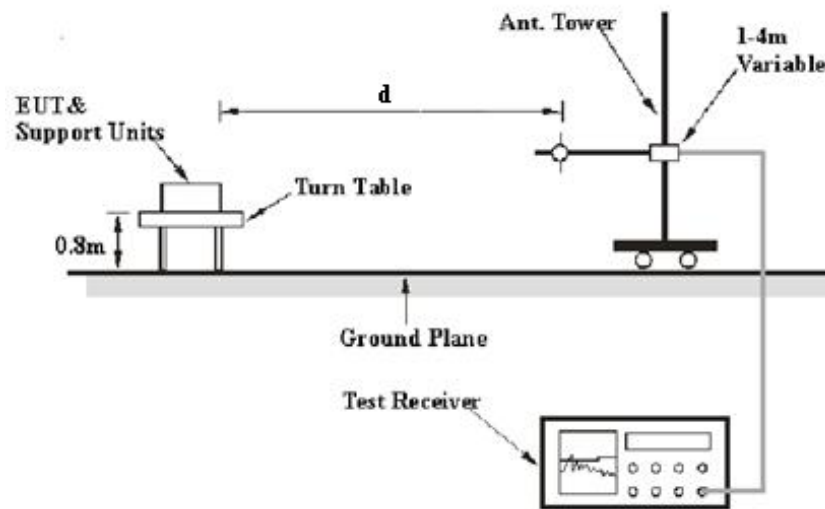
Final Result

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.153788	46.53	---	65.79	19.26	9.000	N	9.6
2.653034	31.43	---	56.00	24.57	9.000	N	9.6
2.990393	35.87	---	56.00	20.13	9.000	N	9.6
4.684615	---	26.02	46.00	19.98	9.000	N	9.6
4.779012	33.47	---	56.00	22.53	9.000	N	9.6
4.851056	---	26.60	46.00	19.40	9.000	N	9.6
10.098279	39.17	---	60.00	20.83	9.000	N	9.7
10.301765	---	31.60	50.00	18.40	9.000	N	9.7
13.352016	---	30.97	50.00	19.03	9.000	N	9.8
13.757617	---	32.95	50.00	17.05	9.000	N	9.8
13.895537	38.69	---	60.00	21.31	9.000	N	9.8
19.800024	---	31.22	50.00	18.78	9.000	N	9.9

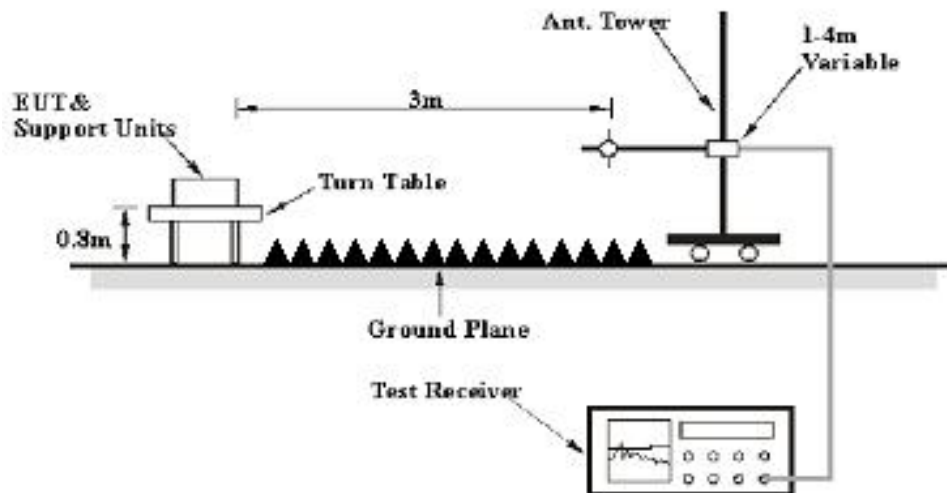
2 - RADIATED EMISSIONS

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed at the 3 meters distance, above 1GHz were performed at the 3 meters, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 13.5 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	Reduced video bandwidth	/	Peak

Test Procedure

During the radiated emissions, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Meter Reading+ Corrected

Note:

Corrected = Antenna Factor + Cable Loss - Amplifier Gain

or

Corrected = Antenna Factor + Cable Loss + Insertion loss of attenuator - Amplifier Gain

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

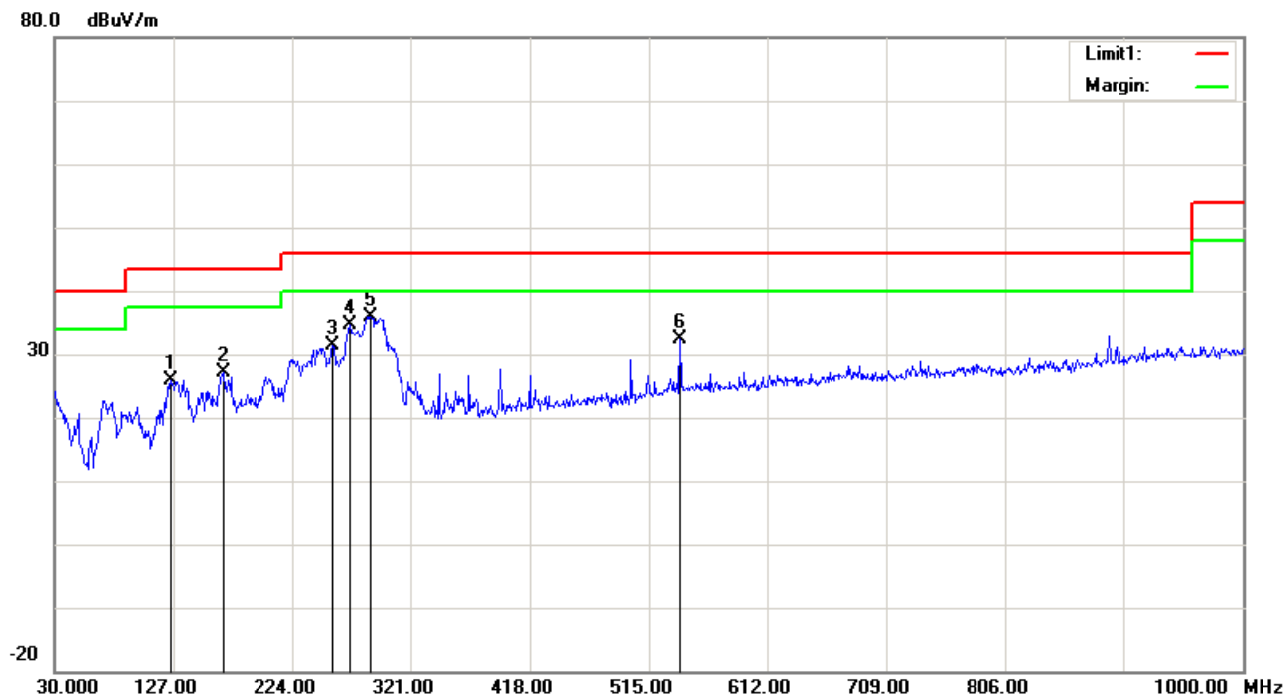
$$\text{Margin} = \text{Limit} - \text{Result}$$

Test Data

Please refer to following table and plots:

Condition: FCC Part 15B Class B
EUT: GS Series
Model: GM01
Test Mode: Operating
Note:

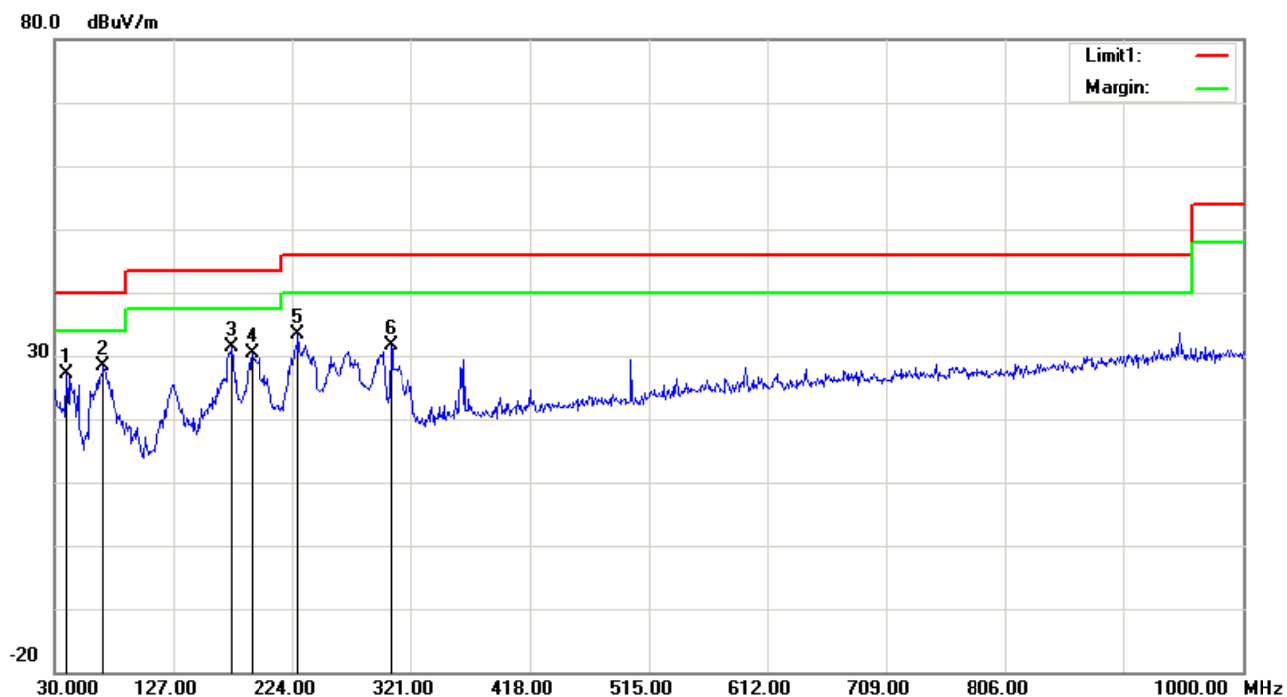
Polarization: Horizontal
Power: DC 12V
Distance: 3m



No.	Frequency (MHz)	Reading (dBμV)	Detector	Corrected (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1	125.0600	37.09	peak	-11.27	25.82	43.50	17.68
2	167.7400	36.47	peak	-9.44	27.03	43.50	16.47
3	256.9800	40.81	peak	-9.44	31.37	46.00	14.63
4	271.5300	43.34	peak	-8.60	34.74	46.00	11.26
5	288.0200	44.17	peak	-8.23	35.94	46.00	10.06
6	540.2200	34.33	peak	-2.05	32.28	46.00	13.72

Condition: FCC Part 15B Class B
EUT: GS Series
Model: GM01
Test Mode: Operating
Note:

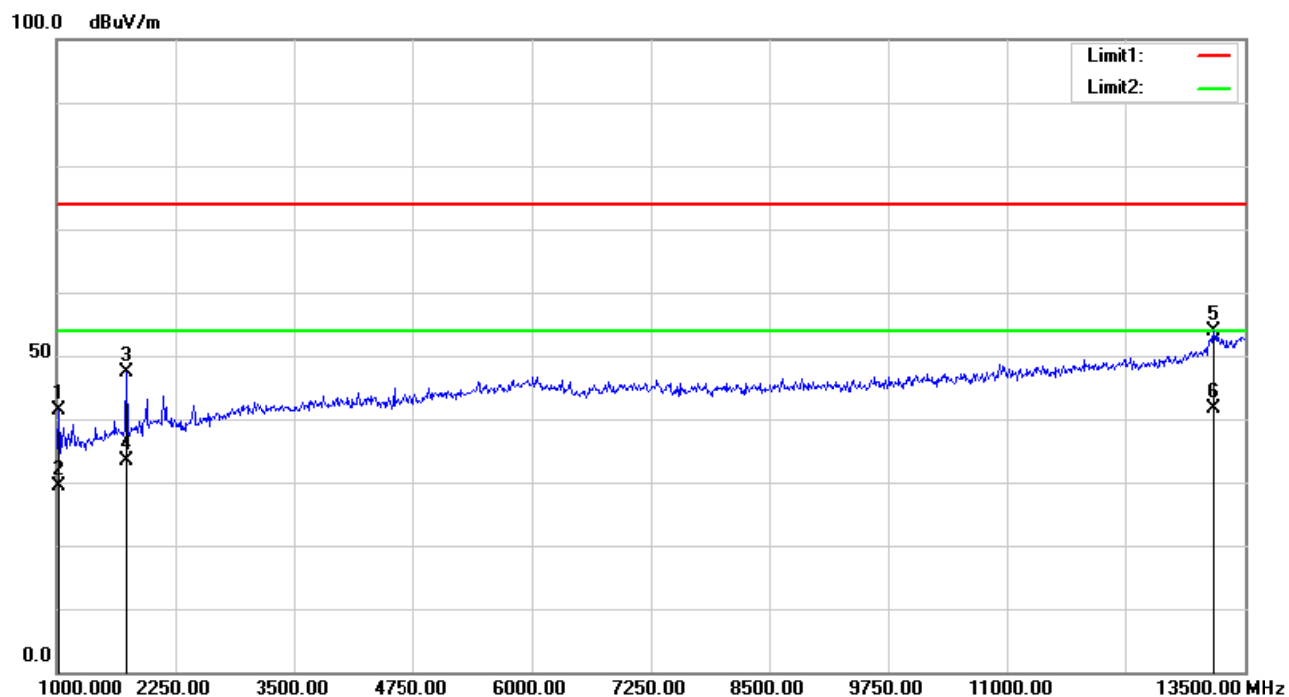
Polarization: Vertical
Power: DC 12V
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	39.7000	36.26	peak	-9.05	27.21	40.00	12.79
2	69.7700	44.69	peak	-16.36	28.33	40.00	11.67
3	174.5300	41.21	peak	-9.74	31.47	43.50	12.03
4	191.0200	40.98	peak	-10.49	30.49	43.50	13.01
5	228.8500	43.97	peak	-10.57	33.40	46.00	12.60
6	304.5100	38.71	peak	-7.20	31.51	46.00	14.49

Condition: FCC Part 15B Class B
EUT: GS Series
Model: GM01
Test Mode: Operating
Note:

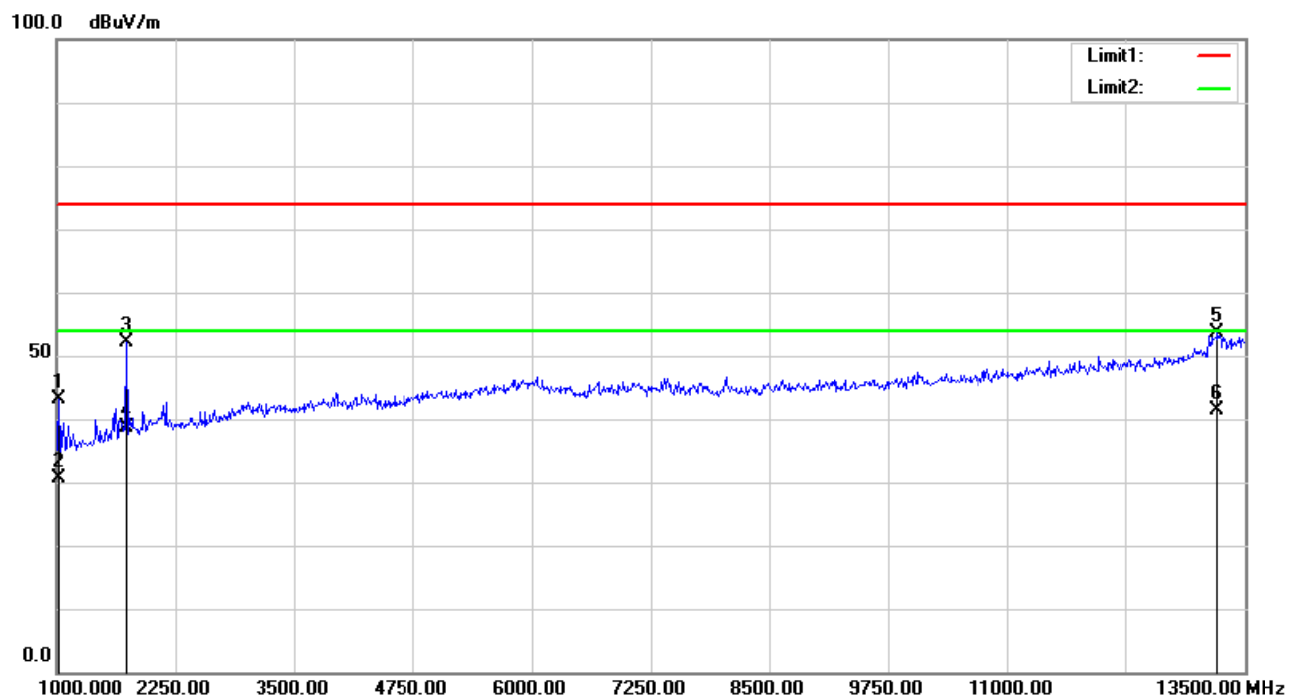
Polarization: Horizontal
Power: DC 12V
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1031.250	42.27	peak	-0.81	41.46	74.00	32.54
2	1031.250	30.16	AVG	-0.81	29.35	54.00	24.65
3	1737.500	45.45	peak	2.04	47.49	74.00	26.51
4	1737.500	31.26	AVG	2.04	33.30	54.00	20.70
5	13181.250	31.65	peak	22.19	53.84	74.00	20.16
6	13181.250	19.52	AVG	22.19	41.71	54.00	12.29

Condition: FCC Part 15B Class B
EUT: GS Series
Model: GM01
Test Mode: Opearting
Note:

Polarization: Vertical
Power: DC 12V
Distance: 3m



No.	Frequency (MHz)	Reading (dB μ V)	Detector	Corrected (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1	1031.250	43.99	peak	-0.81	43.18	74.00	30.82
2	1031.250	31.55	AVG	-0.81	30.74	54.00	23.26
3	1743.750	49.96	peak	2.06	52.02	74.00	21.98
4	1743.750	36.58	AVG	2.06	38.64	54.00	15.36
5	13212.500	31.31	peak	22.24	53.55	74.00	20.45
6	13212.500	19.16	AVG	22.24	41.40	54.00	12.60

*****END OF REPORT*****