



RF TEST REPORT

Product Name: TECHMATE Multi-Function Travel Companion

Model Name: SB3590, SB3590B, SB3590RG, SB3590L and SB3590XXXXX(Where XXXXX denote any printable characters in the ASCII standard character Table to represent variances in cosmetics or buyers)

FCC ID: 2A38HSB3590

Issued For : Jenmart Industrial (HK) Co., Limited

Units A&B, 15/F, Neich Tower, 128 Gloucester Road, Wanchai,
Hong Kong

Issued By : Shenzhen LGT Test Service Co., Ltd.

Room 205, Building 13, Zone B, Zhenxiong Industrial Park,
No.177, Renmin West Road, Jinsha, Kengzi Street, Pingshan
District, Shenzhen, Guangdong, China

Report Number: LGT23L013RF02

Sample Received Date: Dec. 06, 2023

Date of Test: Dec. 06, 2023 – Dec. 27, 2023

Date of Issue: Dec. 27, 2023

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TEST REPORT CERTIFICATION

Applicant: Jenmart Industrial (HK) Co., Limited
Address: Units A&B, 15/F, Neich Tower, 128 Gloucester Road, Wanchai, Hong Kong

Manufacturer: Rich Glory Electronics Co., Ltd.
Address: No.10 Xiling Road, Fengcheng Street, Xinfeng County, Shaoguan City, GuangDong Province, China

Product Name: TECHMATE Multi-Function Travel Companion

Trademark: Studebaker

Model Name: SB3590, SB3590B, SB3590RG, SB3590L and SB3590XXXXX(Where XXXXX denote any printable characters in the ASCII standard character Table to represent variances in cosmetics or buyers)

Sample Status: Normal

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC Part 15 Subpart C ANSI C63.10-2013	PASS

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Technical Director





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Revision History

Rev.	Issue Date	Contents
00	Dec. 27, 2023	Initial Issue



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 15, Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	--
15.209(a)	Radiated emission, Spurious Emission	PASS	--
15.215	20 dB Bandwidth	PASS	--

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report.
- (2) All tests are according to ANSI C63.10-2013.

1.1 TEST FACTORY

Company Name:	Shenzhen LGT Test Service Co., Ltd.
Address:	Room 205, Building 13, Zone B, Zhenxiong Industrial Park, No.177, Renmin West Road, Jinsha, Kengzi Street, Pingshan District, Shenzhen, Guangdong, China
Accreditation Certificate	A2LA Certificate No.: 6727.01
	FCC Registration No.: 746540
	CAB ID: CN0136

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	RF output power, conducted	± 0.68 dB
2	Unwanted Emissions, conducted	± 2.988 dB
3	All emissions, radiated 9K-30MHz	± 2.84 dB
4	All emissions, radiated 30M-1GHz	± 4.39 dB
5	All emissions, radiated 1G-6GHz	± 5.10 dB
6	All emissions, radiated >6G	± 5.48 dB
7	Conducted Emission (9KHz-150KHz)	± 2.79 dB
8	Conducted Emission (150KHz-30MHz)	± 2.80 dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$. The measurement uncertainty is not included in the test result.



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name:	TECHMATE Multi-Function Travel Companion
Trademark:	Studebaker
Model Name:	SB3590
Series Model:	SB3590, SB3590B, SB3590RG, SB3590L and SB3590XXXXX(Where XXXXX denote any printable characters in the ASCII standard character Table to represent variances in cosmetics or buyers)
Model Difference:	Only different in model name
Channel List:	Please refer to the Note 3.
Operating frequency	113-205KHz
Antenna Type:	Coil
Adapter:	Input: 100-240V ~ 50/60Hz 0.8A Output: 5V3A or 9V3A or 12V2.5A or 15V2A or 20V1.5A
Hardware Version:	N/A
Software Version:	N/A
Connecting I/O Port(s):	Please refer to the Note 1.

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.
2. The antenna information refers the manufacturer provide report, applicable only to the tested sample identified in the report. Due to the incorrect antenna information, a series of problems such as the accuracy of the test results will be borne by the customer.

3.

Channel List					
Channel	Frequency (KHz)	Channel	Frequency (KHz)	Channel	Frequency (KHz)
00	136.356	-	-	-	-



2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Wireless output 15W

For Conducted Emission	
Final Test Mode	Description
Mode 4	Wireless output 15W

For Radiated Emission	
Final Test Mode	Description
Mode 4	Wireless output 15W



2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Accessories Equipment

Description	Manufacturer	Model	S/N	Rating
Adapter	Shenzhen Keyu Power Supply Technology Co., Ltd	KA30E-US	N/A	Input: 100-240V ~ 50/60Hz 0.8A Output: 5V3A or 9V3A or 12V2.5A or 15V2A or 20V1.5A
USB-C to USB-C Cable	N/A	N/A	N/A	1m

Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Laptop	Lenovo	HKF-16	N/A	N/A
Wireless charging tester fixture	SiLiYuan	SK-99899	N/A	5W, 7.5W, 10W, 15W

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (2) “YES” is means “with core”; “NO” is means “without core”.



2.4 EQUIPMENTS LIST

Conducted Emission

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
EMI Test Receiver	R&S	ESU	100372	2023.04.13	2024.04.12
LISN	COM-POWER	LI-115	02032	2023.04.07	2024.04.06
LISN	SCHWARZBECK	NNLK 8122	00160	2023.04.07	2024.04.06
CE Cable	N.A	C01	N.A	2023.04.07	2024.04.06
Transient Limiter	CYBERTEK	EM5010A	E2250100049	2023.04.07	2024.04.06
Temperature & Humidity	KTJ	TA218B	N.A	2023.04.24	2024.04.23
Testing Software	EMC-I_V1.4.0.3_SKET				

Radiation Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
EMI Test Receiver	R&S	ESU8	100372	2023.04.13	2024.04.12
Active loop Antenna	ETS	6502	00049544	2022.06.02	2025.06.01
Spectrum Analyzer	Keysight	N9010B	MY60242508	2023.08.14	2024.08.13
Bilog Antenna	Schwarzbeck	VULB 9168	01447	2022.12.12	2025.12.11
Horn Antenna	Schwarzbeck	3115	10SL0060	2022.06.02	2025.06.01
Pre-amplifier (9kHz-1GHz)	EMtrace	RP01A	02017	2023.04.07	2024.04.06
Pre-amplifier (1-26.5G)	Agilent	8449B	3008A4722	2023.04.07	2024.04.06
Temperature & Humidity	KTJ	TA218B	N.A	2023.04.24	2024.04.23
Testing Software	EMC-I_V1.4.0.3_SKET				

RF Connected Test equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
Signal Generator	Keysight	N5182B	MY59100717	2023.04.07	2024.04.06
Signal Analyzer	Keysight	N9010B	MY60242508	2023.08.14	2024.08.13
Temperature & Humidity	KTJ	TA218B	N/A	2023.04.24	2024.04.23
Temperature & Humidity test chamber	AISRY	LX-1000L	171200018	2023.08.14	2024.08.13
Attenuator	eastsheep	90db	N/A	2023.04.10	2024.04.09
Testing Software	MTS 8310_2.0.0.0_MWRF-TEST				



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Conducted Emission limit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of “ * ” marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

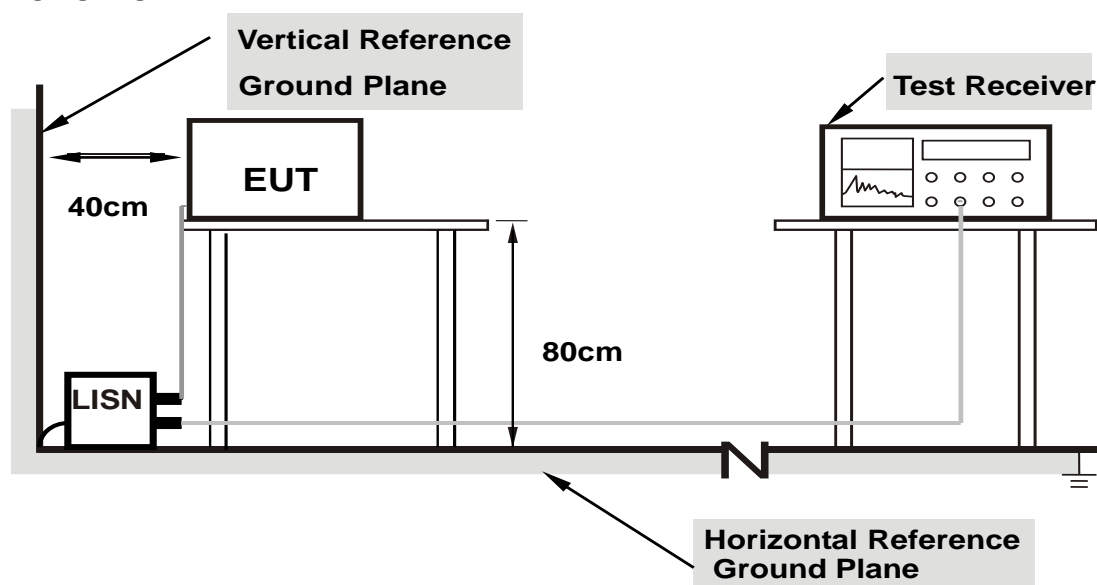
Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz



3.1.2 TEST PROCEDURE

- a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN is at least 80 cm from the nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



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

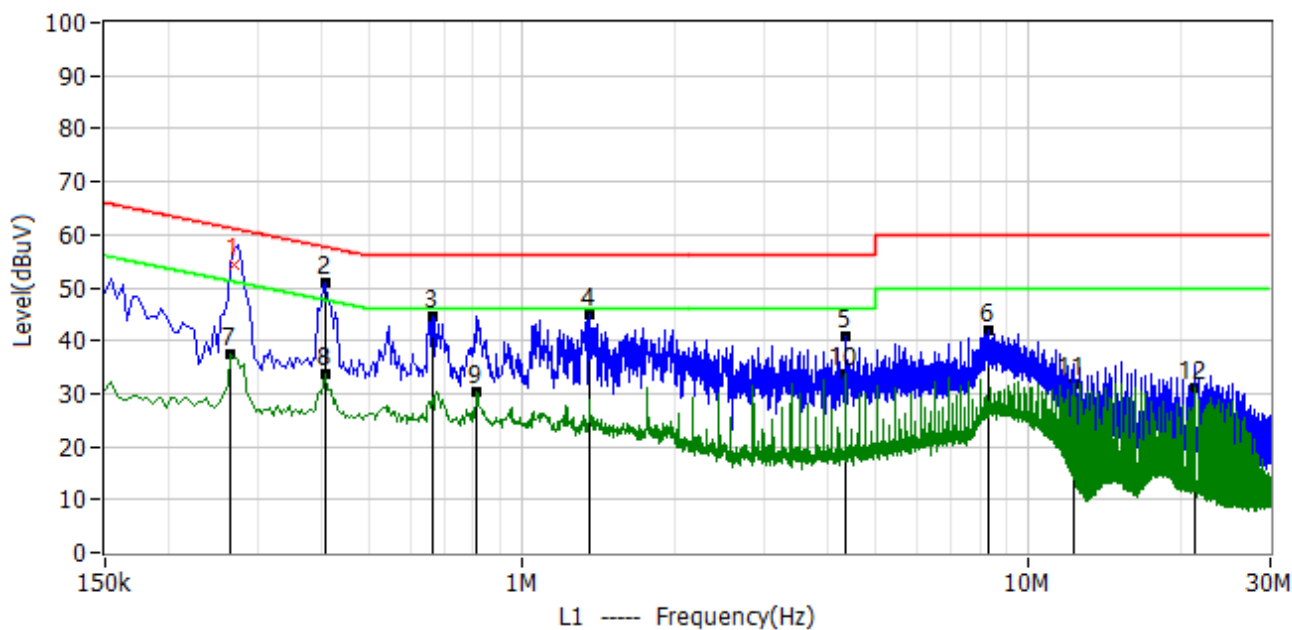
3.1.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



3.1.5 TEST RESULT

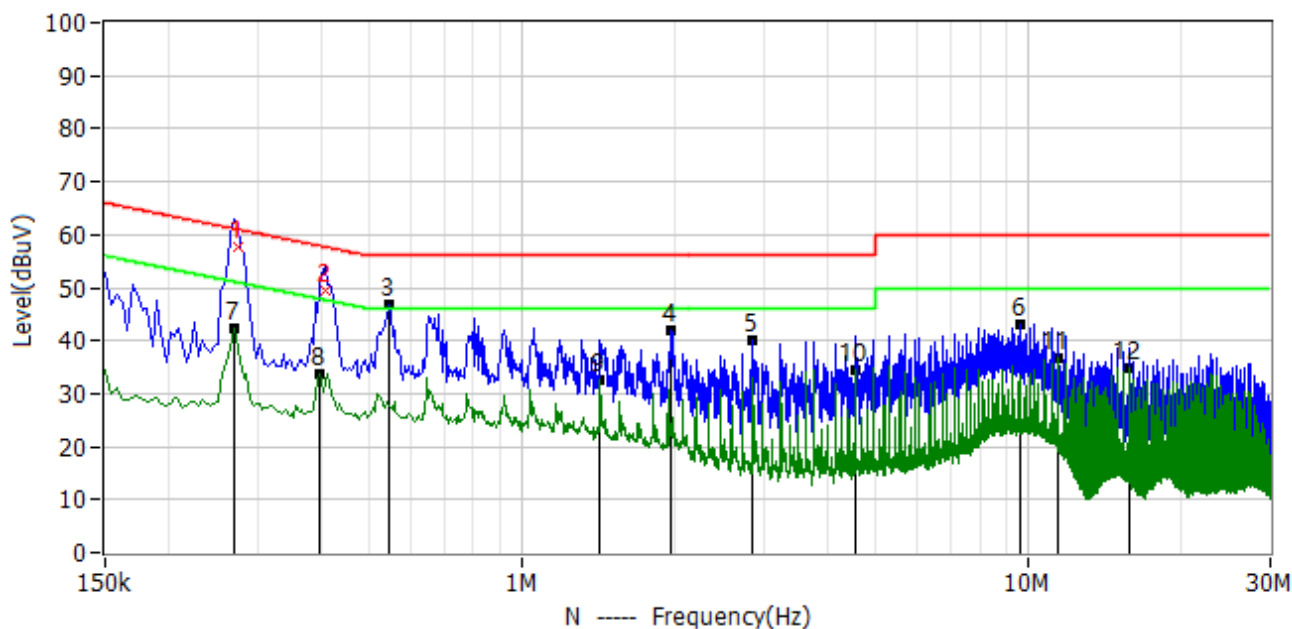
Project: LGT23L013	Test Engineer: LiuH
EUT: TECHMATE Multi-Function Travel Companion	Temperature: 20.1°C
M/N: SB3590	Humidity: 42%RH
Test Voltage: AC 120V/60Hz	Test Data: 2023-12-20
Test Mode: Wireless output 15W	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Detector	Polar
1	0.270	43.99	10.50	54.49	61.12	-6.63	QP	L1
2*	0.410	40.54	10.49	51.03	57.65	-6.62	QP	L1
3*	0.666	34.17	10.50	44.67	56.00	-11.33	QP	L1
4*	1.358	34.19	10.59	44.78	56.00	-11.22	QP	L1
5*	4.346	30.07	10.78	40.85	56.00	-15.15	QP	L1
6*	8.290	30.92	10.91	41.83	60.00	-18.17	QP	L1
7*	0.266	27.09	10.49	37.58	51.24	-13.66	AV	L1
8*	0.410	23.23	10.49	33.72	47.65	-13.93	AV	L1
9*	0.814	19.94	10.51	30.45	46.00	-15.55	AV	L1
10*	4.346	23.05	10.78	33.83	46.00	-12.17	AV	L1
11*	12.222	20.94	10.97	31.91	50.00	-18.09	AV	L1
12*	21.318	19.78	11.12	30.90	50.00	-19.10	AV	L1



Project: LGT23L013	Test Engineer: LiuH
EUT: TECHMATE Multi-Function Travel Companion	Temperature: 20.1°C
M/N: SB3590	Humidity: 42%RH
Test Voltage: AC 120V/60Hz	Test Data: 2023-12-20
Test Mode: Wireless output 15W	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Detector	Polar
1	0.274	47.11	10.50	57.61	61.00	-3.39	QP	N
2	0.410	38.78	10.50	49.28	57.65	-8.37	QP	N
3*	0.546	36.27	10.50	46.77	56.00	-9.23	QP	N
4*	1.970	31.20	10.71	41.91	56.00	-14.09	QP	N
5*	2.850	29.32	10.74	40.06	56.00	-15.94	QP	N
6*	9.638	32.21	10.99	43.20	60.00	-16.80	QP	N
7*	0.270	31.95	10.49	42.44	51.12	-8.68	AV	N
8*	0.398	23.20	10.49	33.69	47.90	-14.21	AV	N
9*	1.426	21.85	10.60	32.45	46.00	-13.55	AV	N
10*	4.538	23.76	10.79	34.55	46.00	-11.45	AV	N
11*	11.462	25.65	10.99	36.64	50.00	-13.36	AV	N
12*	15.758	23.73	11.10	34.83	50.00	-15.17	AV	N



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part 15.209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

§ 15.209(d)The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

3.2.2 TEST PROCEDURE

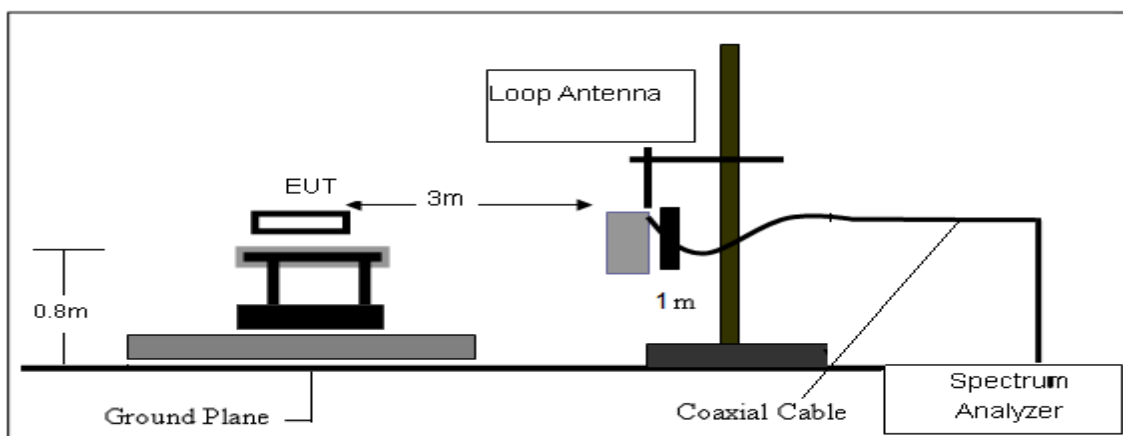
- a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- d. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

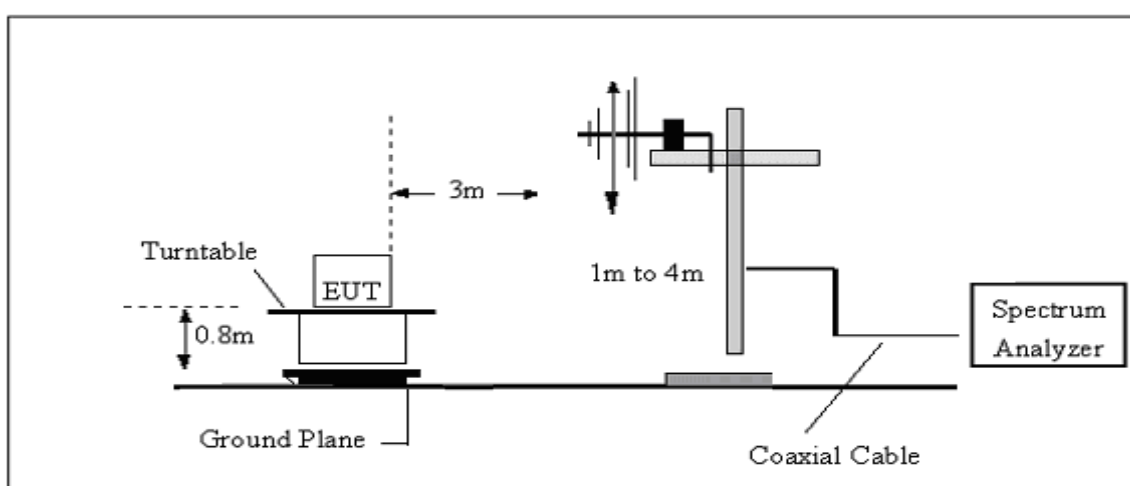
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

3.2.3 TESTSETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz

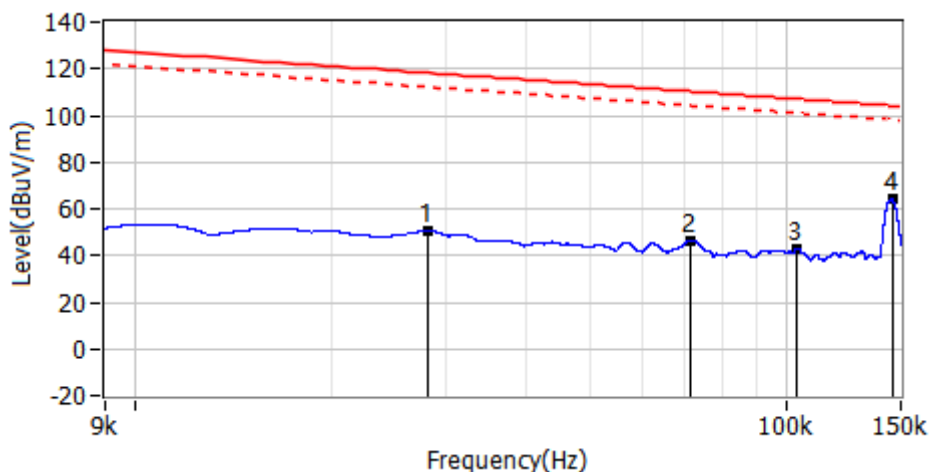




3.2.7 TEST RESULTS

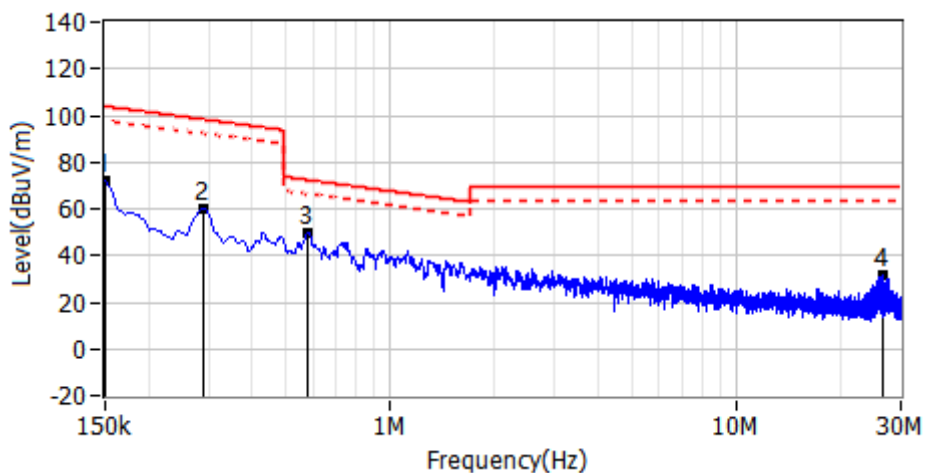
Spurious Radiated Emission Below 30 MHz

9KHz-150KHz



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector
1*	28.0879kHz	36.76	13.69	50.45	118.26	-67.81	PK
2*	71.1986kHz	34.35	12.00	46.35	110.30	-63.96	PK
3*	104.0516kHz	30.76	12.00	42.76	107.06	-64.30	PK
4*	145.3999kHz	52.07	12.00	64.07	104.19	-40.12	PK

150KHz-30MHz

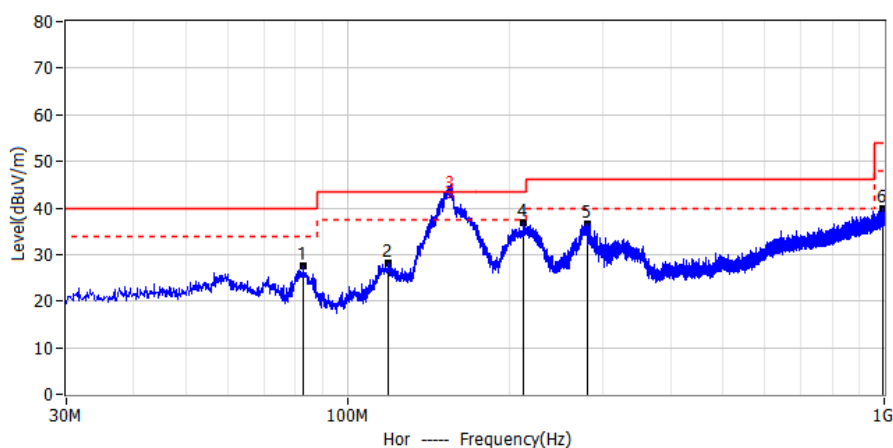


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector
1*	150.0000kHz	60.30	12.00	72.30	103.93	-31.63	PK
2*	288.0562kHz	48.40	12.00	60.40	98.35	-37.94	PK
3*	579.0938kHz	38.08	12.00	50.08	72.35	-22.27	PK
4*	26.7165MHz	22.36	9.50	31.86	69.54	-37.68	PK

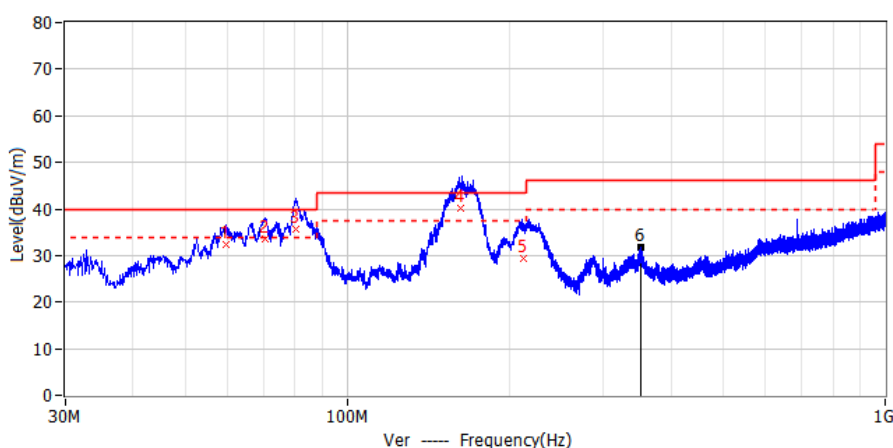


Spurious Radiated Emission Below 1 GHz

Project: LGT23L013	Test Engineer: Xiangdong Ma
EUT: TECHMATE Multi-Function Travel Companion	Temperature: 28.6°C
M/N: SB3590	Humidity: 50%RH
Test Voltage: AC 120V/60Hz	Test Data: 2023-12-25
Test Mode: Wireless output 15W	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	82.986	12.32	15.16	27.48	40.00	-12.52	PK	Hor
2*	118.998	10.47	17.55	28.02	43.50	-15.48	PK	Hor
3	156.253	23.01	19.90	42.91	43.50	-0.59	QP	Hor
4*	213.451	20.02	16.97	36.99	43.50	-6.51	PK	Hor
5*	280.139	17.06	19.52	36.58	46.00	-9.42	PK	Hor
6*	993.331	5.32	34.54	39.86	54.00	-14.14	PK	Hor



No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1	59.603	13.77	18.70	32.47	40.00	-7.53	QP	Ver
2	70.567	15.73	17.90	33.63	40.00	-6.37	QP	Ver
3	80.483	20.53	15.20	35.73	40.00	-4.27	QP	Ver
4	162.685	20.23	19.80	40.03	43.50	-3.47	QP	Ver
5	213.071	12.51	17.00	29.51	43.50	-13.99	QP	Ver
6*	351.798	10.43	21.25	31.68	46.00	-14.32	QP	Ver



4. BANDWIDTH TEST

4.1 LIMIT

FCC Part 15.215, Only applicable to report.

4.2 TEST PROCEDURE

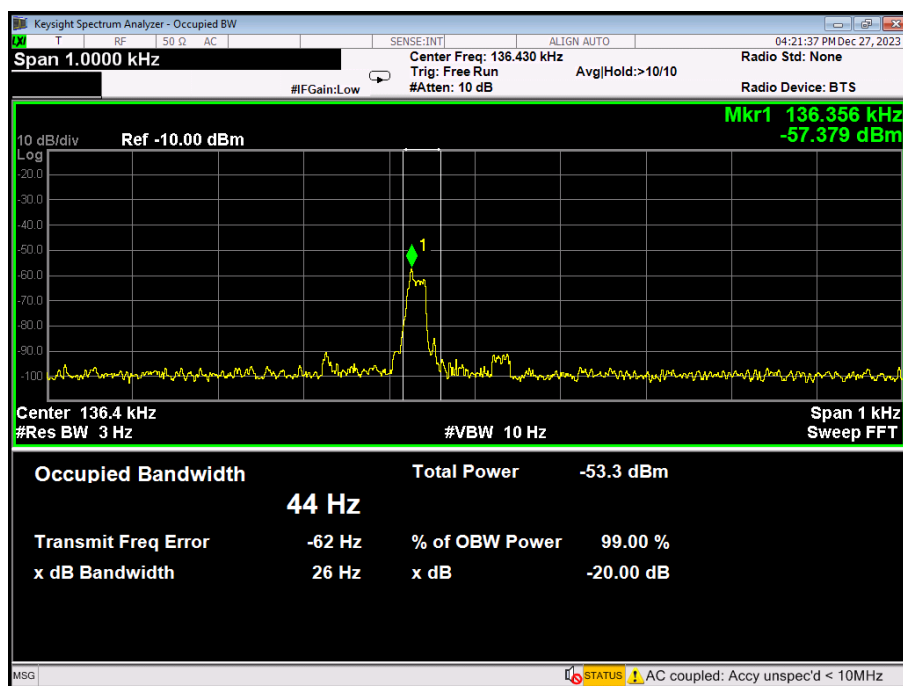
Spectrum Parameter	Setting
Span Frequency	between two times and five times the OBW
RB	1% to 5% of the OBW
VB	approximately three times RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

The test program and configuration, refer to 3.2.2 and 3.2.3.

4.3 TEST RESULTS

Operating Frequency (kHz)	20 dB Bandwidth(kHz)
136.356	0.026

CH00



※※※※END OF THE REPORT※※※※