



FCC RADIO TEST REPORT

Applicant : SteelSeries ApS.

Address : 656 W Randolph St., Suite 3E Chicago,
IL 60661, USA

Equipment : Wireless Headset

Model No. : HS31

Trade Name : **steelseries**

FCC ID : ZHK-HS31

I HEREBY CERTIFY THAT :

The sample was received on Feb. 10, 2025 and the testing was completed on Mar. 05, 2025 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao / Supervisor

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory





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History of this test report



1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.247

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	PASS
15.207	. AC Power Line Conducted Emission	PASS
15.209 15.205	. Radiated Spurious Emission	PASS

*The lab has reduced the uncertainty risk factor from test equipment, environment and staff technicians which according to the standard on contract. Therefore, the test result will only be determined by standard requirement, measurement uncertainty evaluation is not considered.

*This EUT has been also tested and compiled with the requirement of FCC Part 15, Subpart B, recorded in a separate test report(25020008-TEFV01).

*Modify headset structure, the differences is list below:

1. Update charger IC.

2. Add new battery.

*After engineering evaluation, the following item need to verified:

1. AC Power Line Conducted Emission

2. Radiated Spurious Emission(30MHz ~ 1GHz)



2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Operation Frequency Range	BT / BLE: 2400-2483.5MHz
Center Frequency Range	BT / BLE: 2402MHz-2480MHz
Modulation Type	BT: GFSK, $\pi/4$ -DQPSK, 8DPSK BLE / 2.4G: GFSK
Modulation Technology	FHSS, DTS
Data Rate	BT: GFSK: 1Mbps, $\pi/4$ -DQPSK: 2Mbps, 8DPSK: 3Mbps BLE / 2.4G: GFSK: 1Mbps, 2Mbps
Antenna Type	monopole Antenna
Antenna Gain	For BT / BLE: 2402-2480MHz: 0.9dBi For 2.4G: 2402-2480MHz: 1.1dBi
Charging cable	Brand: steelseries Model: usb_cable01
Audio cable	Brand: steelseries Model: audio_01
Battery	Brand: HUIZHOU EVERPOWER TECHNOLOGY CO.,LTD Model: PL603033
	New addition: Brand: Chongqing VDL Electronics Co.,Ltd. Model: 653033PN3

Note: For more details, please refer to the User's manual of the EUT.

Charger IC (Original)	With Battery Brand: HUIZHOU EVERPOWER TECHNOLOGY CO.,LTD Model: PL603033
Charger IC (New)	With Battery Brand: Chongqing VDL Electronics Co.,Ltd. Model: 653033PN3



2.2 Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
*00	2402	20	2422	40	2442	60	2462
01	2403	21	2423	41	2443	61	2463
02	2404	22	2424	42	2444	62	2464
03	2405	23	2425	43	2445	63	2465
04	2406	24	2426	44	2446	64	2466
05	2407	25	2427	45	2447	65	2467
06	2408	26	2428	46	2448	66	2468
07	2409	27	2429	47	2449	67	2469
08	2410	28	2430	48	2450	68	2470
09	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	*78	2480
19	2421	*39	2441	59	2461	---	---

Note: Channels marked * are selected to perform test.



2.3 Test Mode & Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.10
- b. The complete test system included Notebook and EUT for RF test.
- c. An executive program, "Blue Test3 ver.3.2.2.144" under Windows OS system was executed to transmit and receive data via Bluetooth.
- d. The following test modes were performed for the test:

Conducted Emissions from the AC mains power ports	
Test Mode	Operating Description
1	TX Mode From Adapter(AC 120V/60Hz)
2	TX Mode From Adapter(AC 240V/60Hz)
caused "Test Mode 1" generated the worst case, it was reported as the final data.	
Radiation Emissions (30MHz ~ 1GHz)	
Test Mode	Operating Description
1	TX Mode From Adapter(AC 120V/60Hz)
2	TX Mode From Adapter(AC 240V/60Hz)
caused "Test Mode 1" generated the worst case, it was reported as the final data.	

Modulation Type	TX CONFIGURATION
GFSK	1TX
$\pi/4$ -DQPSK	1TX
8DPSK	1TX



2.4 Description of Test System

Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
Adapter	Noratec	NT-K240	N/A	N/A
testfixture	Goertek Inc.	EST_CABLE	1m / NS	N/A

AC Power Line Conducted Emission				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
Adapter	Noratec	NT-K240	N/A	N/A
testfixture	Goertek Inc.	EST_CABLE	1m / NS	N/A



2.5 General Information of Test

Organization	Cerpass Technology Corp.		
☒ Test Site	<p>Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel: +886-3-3226-888 Fax: +886-3-3226-881</p> <p>FCC TW1439, TW1079</p> <p>IC 4934E-1, 4934E-2</p>		
Frequency Range Investigated	<p>Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 25,000MHz</p>		
Test Distance	The test distance of radiated emission from antenna to EUT is 3 M.		

Test Item	Test Site	Test Period	Environmental Conditions	Tested By
Radiated Emissions	3M02-NK	2025/03/04	18.6°C / 58%	Park Chen
AC Power Line Conducted Emission	CON02-NK	2025/03/05	21.5°C / 68%	Park Chen



2.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Item	Uncertainty
AC Power Line Conduction(9K~30MHz)	±3.2dB
Radiated Spurious Emission(9KHz~30MHz)	±3.5dB
Radiated Spurious Emission(30MHz~1GHz)	±5.1dB



3. Test Equipment and Ancillaries Used for Tests

Test Item	Radiated Emissions				
Test Site	Semi Anechoic Room(3M02-NK)				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
Bilog Antenna	Schwarzbeck	VULB9168	369	2024/02/19	2025/02/18
Active Loop Antenna	EMCO	6507	00040855	2024/05/02	2025/05/01
Horn Antenna	EMCO	3115	31589	2024/02/26	2025/02/25
Horn Antenna	EMCO	3116	31970	2024/02/23	2025/02/22
EMI Receiver	ROHDE & SCHWARZ	ESR 7	101906	2024/05/13	2025/05/12
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	101329	2024/07/16	2025/07/15
Preamplifier	Agilent	8449B	3008A01954	2024/03/01	2025/02/28
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2024/10/15	2025/10/14
Preamplifier	EM Electronics corp.	EM330	60659	2024/02/17	2025/02/16
Cable-4m(9k-3G)	EMEC	RG-223	18274M	2024/08/08	2025/08/07
Cable-3in1(30M-1G)	HARBOUR INDUSTRIES	LL142	CCE1315	2024/02/23	2025/02/22
Cable-0.5m(1G-40G)	HUBER SUHNER	SUCOFLEX 104	805443/4	2025/02/26	2026/02/25
Cable-3m(1G-40G)	HUBER SUHNER	SUCOFLEX 104	805796/4	2025/02/26	2026/02/25
Cable-8m(1G-26.5G)	WOKEN	WCBA-WCA203SM	CCE1374	2025/02/26	2026/02/25
Cable-1m(1G-40G)	HUBER SUHNER	HUBER SUHNER / SF102	804398/2	2024/10/14	2025/10/13
Cable-3m(1G-40G)	HUBER SUHNER	HUBER SUHNER / SF102	804619/2	2024/10/14	2025/10/13
E3	AUDIX	v8.2014-8-6	RK-000529	NA	NA
Highpass Filter	Warison	WFIL-H3000-18000F-03	WRJ5CFWC2J1	2024/07/03	2025/07/02
Notch Filter	Warison	WFIL-N5925-7125F-04	WRQ4BFWC4M1	2024/03/11	2025/03/10
Hipass Filter	Warison	WFIL-H7500-18000F	WRQ4BFWC2J1	2024/03/11	2025/03/10



Test Item	AC Power Line Conducted Emission				
Test Site	CON02-NK				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
EMI Receiver	ROHDE & SCHWARZ	ESR 7	101906	2024/05/13	2025/05/12
Cable-4m(9k-3G)	EMEC	RG-223	18274M	2024/08/08	2025/08/07
Line Impedance Stabilization Network	Schwarzbeck	NSLK 8127	8127740	2024/08/27	2025/08/26
Two-Line V-Network	ROHDE & SCHWARZ	ENV216	102185	2024/08/27	2025/08/26
E3	AUDIX	v8.2014-8-6	RK-000531	NA	NA



4. Antenna Requirements

4.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2 Antenna Construction and Directional Gain

Antenna Type	monopole Antenna
Antenna Gain	0.9 dBi



5. Test of AC Power Line Conducted Emission

5.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.10-2013. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

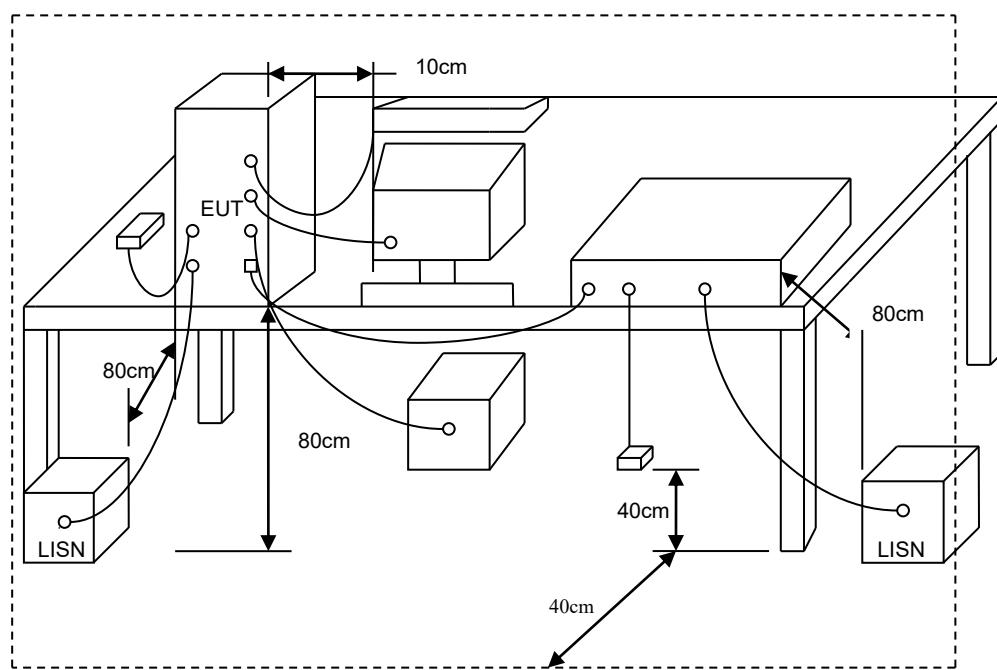
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

*Decreases with the logarithm of the frequency.

5.2 Test Procedures

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

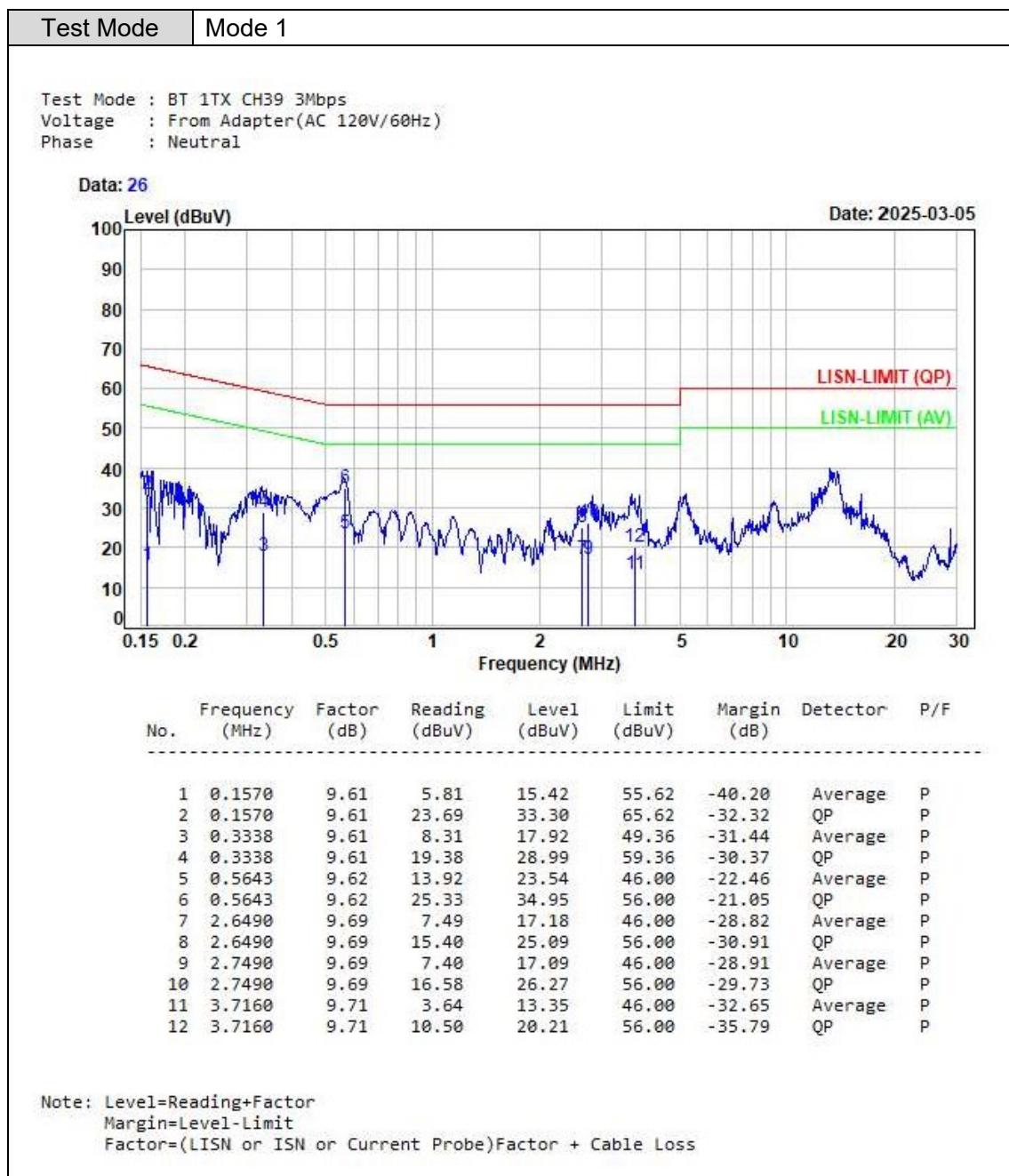
5.3 Typical Test Setup





5.4 Test Result and Data







6. Test of Radiated Spurious Emission

6.1 Test Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

Frequency (MHz)	Field Strength (microvolt/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



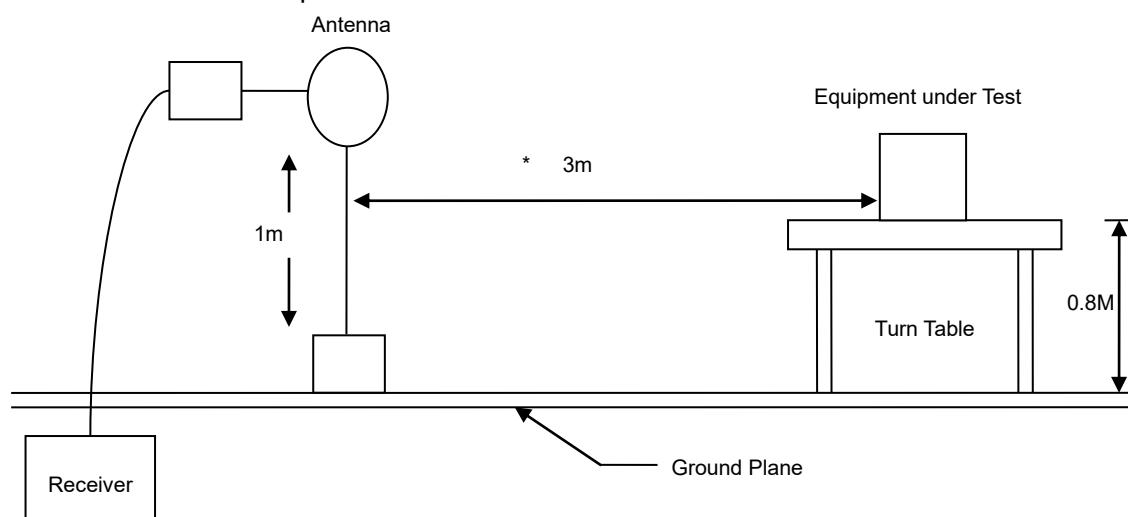
6.2 Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- i. "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

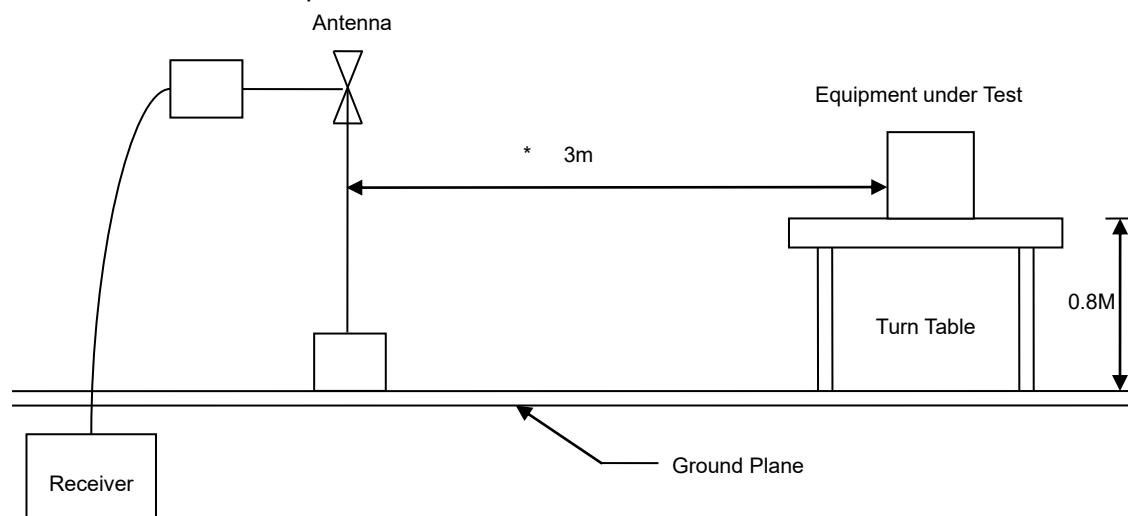
Note: The supporting fixture shall permit orientation of the EUT in each of three orthogonal axis positions such that emissions from the EUT are maximized.
(Y-AXIS is the worst.)

6.3 Typical Test Setup

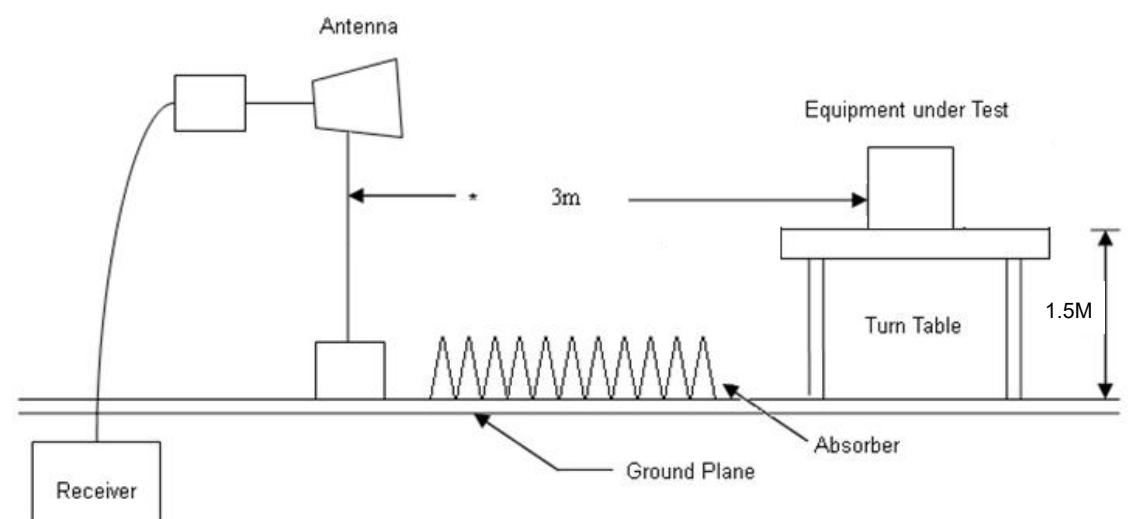
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup

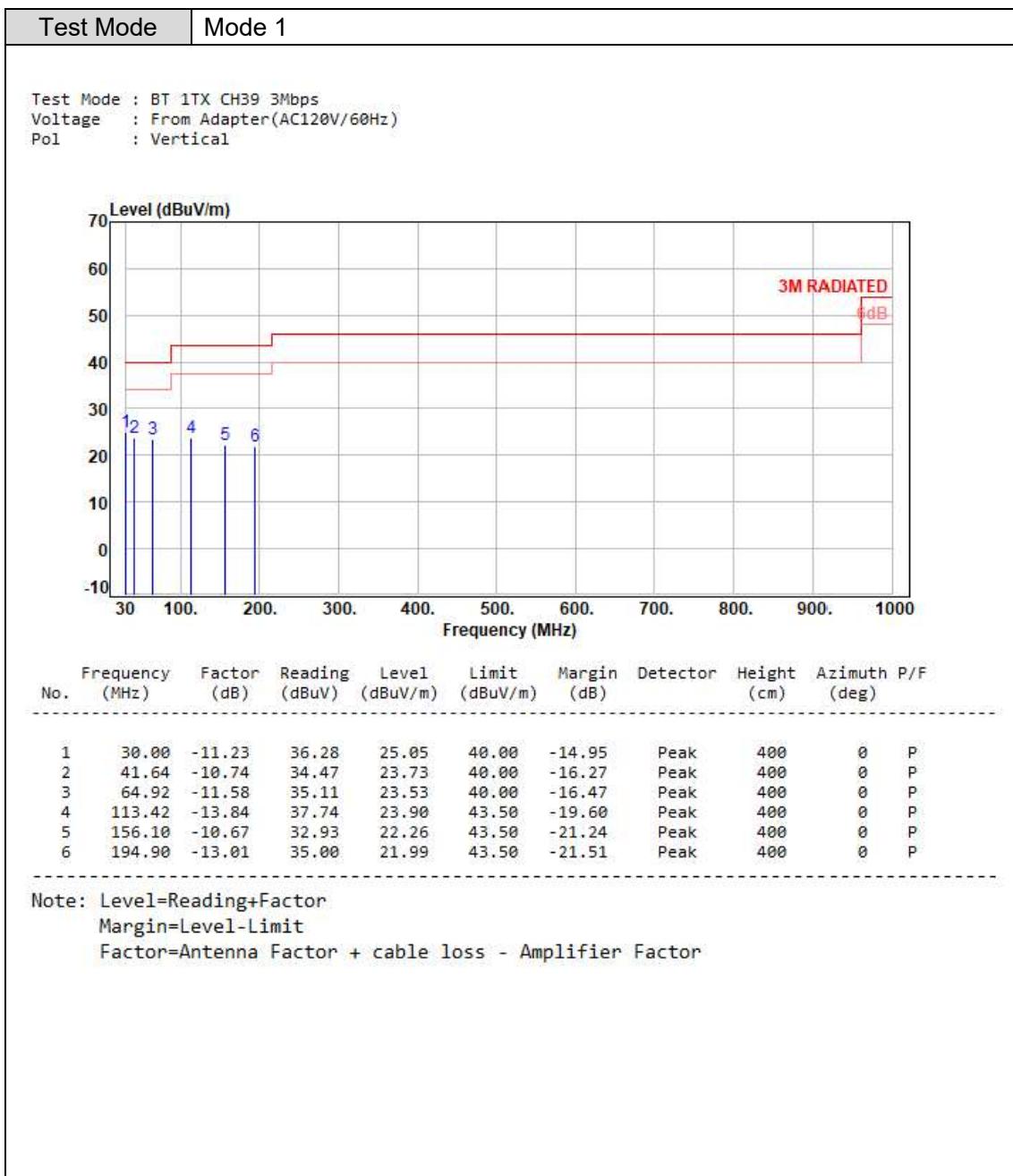


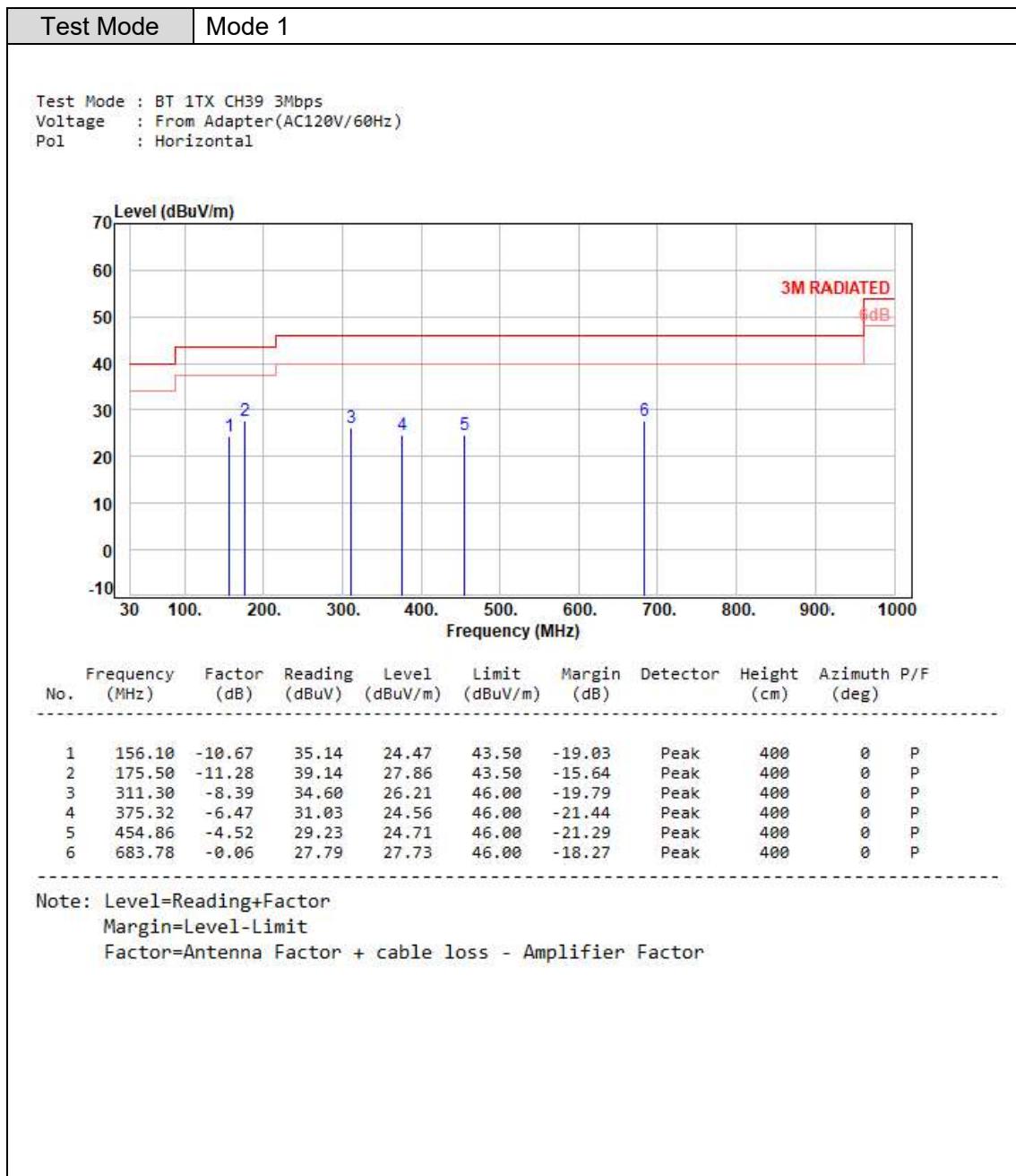


6.4 Test Result and Data (9kHz ~ 30MHz)

The 9kHz-30MHz spurious emission is under limit 20dB more.

6.5 Test Result and Data (30MHz ~ 1GHz)







6.6 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

**: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz