

RF TEST REPORT

Product Name: Broadcasting amplifier

Model Name: MA-BT240

FCC ID: XEG-MABT240

Issued For : TEAC Corporation

1-47 Ochiai, Tama-shi, Tokyo 206-8530 Japan

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: LGT23K118RF04

Sample Received Date: Nov. 28, 2023

Date of Test: Nov. 28, 2023 – Jan. 08, 2024

Date of Issue: Jan. 08, 2024

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TEST REPORT CERTIFICATION

Applicant: TEAC Corporation

Address: 1-47 Ochiai, Tama-shi, Tokyo 206-8530 Japan

Manufacturer: Mansion Industry Co., Ltd.

No.402, Xiangshan Rd., The 3rd Industrial Park, Luotian Community, Address:

Songgang Street, Baoan District, Shenzhen, Guangdong, 518105 China

Product Name: Broadcasting amplifier

Trademark: TEAC

Model Name: MA-BT240

Sample Status: Normal

APPLICABLE STANDARDS			
STANDARD	TEST RESULTS		
FCC Part 15.247, Subpart C ANSI C63.10-2013	PASS		

Prepared by:

Zane Shan

Zane Shan

Engineer

Approved by:

Vita Li

Technical Director

Report No.: LGT23K118RF04 Page 2 of 49



Table of Contents	
1. SUMMARY OF TEST RESULTS	6
1.1 TEST FACTORY	7
1.2 MEASUREMENT UNCERTAINTY	7
2. GENERAL INFORMATION	8
2.1 GENERAL DESCRIPTION OF THE EUT	8
2.2 DESCRIPTION OF THE TEST MODES	9
2.3 TEST SOFTWARE AND POWER LEVEL	9
2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS	10
2.5 EQUIPMENTS LIST	11
3. EMC EMISSION TEST	12
3.1 CONDUCTED EMISSION MEASUREMENT	12
3.2 TEST PROCEDURE	13
3.3 TEST SETUP	13
3.4 EUT OPERATING CONDITIONS	13
3.5 TEST RESULTS	14
4. RADIATED EMISSION MEASUREMENT	16
4.1 RADIATED EMISSION LIMITS	16
4.2 TEST PROCEDURE	18
4.3 TEST SETUP	19
4.4 EUT OPERATING CONDITIONS	19
4.5 FIELD STRENGTH CALCULATION	20
4.6 TEST RESULTS	21
4.7 TEST RESULTS (BAND EDGE REQUIREMENTS)	26
5. CONDUCTED SPURIOUS & BAND EDGE EMISSION	28
5.1 LIMIT	28
5.2 TEST PROCEDURE	28
5.3 TEST SETUP	28
5.4 EUT OPERATION CONDITIONS	28
5.5 TEST RESULTS	28
6. POWER SPECTRAL DENSITY TEST	29
6.1 LIMIT	29
6.2 TEST PROCEDURE	29
6.3 TEST SETUP	29

Report No.: LGT23K118RF04 Page 3 of 49



Table of Contents	Page
6.4 EUT OPERATION CONDITIONS	29
6.5 TEST RESULTS	29
7. BANDWIDTH TEST	30
7.1 LIMIT	30
7.2 TEST PROCEDURE	30
7.3 TEST SETUP	30
7.4 EUT OPERATION CONDITIONS	30
7.5 TEST RESULTS	30
8. PEAK OUTPUT POWER TEST	30
8.1 LIMIT	30
8.2 TEST PROCEDURE	31
8.3 TEST SETUP	31
8.4 EUT OPERATION CONDITIONS	31
8.5 TEST RESULTS	31
9. ANTENNA REQUIREMENT	32
9.1 STANDARD REQUIREMENT	32
9.2 EUT ANTENNA	32
10. FREQUENCY STABILITY	33
10.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT	33
10.2 TEST PROCEDURE	33
10.3 TEST RESULT	33
APPENDIX I - TEST RESULTS	34
DUTY CYCLE	34
MAXIMUM AVERAGE CONDUCTED OUTPUT POWER	36
MAXIMUM PEAK CONDUCTED OUTPUT POWER	37
-6DB BANDWIDTH	38
OCCUPIED CHANNEL BANDWIDTH	40
MAXIMUM POWER SPECTRAL DENSITY LEVEL	42
BAND EDGE	44
CONDUCTED RF SPURIOUS EMISSION	47

Report No.: LGT23K118RF04 Page 4 of 49



Revision History

Rev.	Issue Date	Contents
00	Jan. 08, 2024	Initial Issue

Report No.: LGT23K118RF04 Page 5 of 49



1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards: KDB 558074 D01 15.247 Meas Guidance v05r02.

FCC Part 15.247, Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (a)(2)	6dB&99% Bandwidth	PASS	
15.247 (b)(3)	Output Power	PASS	
15.209	Radiated Spurious Emission	PASS	
15.247 (d)	Conducted Spurious & Band Edge Emission	PASS	
15.247 (e)	Power Spectral Density	PASS	
15.205	Restricted Band Edge Emission	PASS	
Part 15.247(d)/ Part 15.209(a)	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

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

Report No.: LGT23K118RF04 Page 6 of 49



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	
	A2LA Certificate No.: 6727.01	
Accreditation Certificate	FCC Registration No.: 746540	
	CAB ID: CN0136	

1.2 MEASUREMENT UNCERTAINTY

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

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

Note: The measurement uncertainty is not included in the test result.

Report No.: LGT23K118RF04 Page 7 of 49



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name:	Broadcasting amplifier		
Trademark:	TEAC		
Model Name:	MA-BT240		
Series Model:	N/A		
Model Difference:	N/A		
	Operation Frequency:	2402~2480 MHz	
	Modulation Type:	GFSK	
	Radio Technology:	BLE	
Product Description:	Bluetooth Configuration:	BLE (1M PHY)	
	Number Of Channel:	40	
	Antenna Type:	External	
	Antenna Gain (dBi):	1.09	
Channel List:	Please refer to the Note 3.		
Rating:	Input: AC 100-240V, 50/60Hz		
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 to 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.

			Chan	nel List			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	10	2422	20	2442	30	2462
01	2404	11	2424	21	2444	31	2464
02	2406	12	2426	22	2446	32	2466
03	2408	13	2428	23	2448	33	2468
04	2410	14	2430	24	2450	34	2470
05	2412	15	2432	25	2452	35	2472
06	2414	16	2434	26	2454	36	2474
07	2416	17	2436	27	2456	37	2476
08	2418	18	2438	28	2458	38	2478
09	2420	19	2440	29	2460	39	2480

Report No.: LGT23K118RF04 Page 8 of 49



2.2 DESCRIPTION OF THE TEST MODES

For conducted test items and radiated spurious emissions Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively.

Worst Mode	Description	Data/Modulation
Mode 1	TX CH00(2402MHz)	1 MHz/GFSK
Mode 2	TX CH19(2440MHz)	1 MHz/GFSK
Mode 3	TX CH39(2480MHz)	1 MHz/GFSK

Note:

- (1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.
- (2) We have be tested for all avaiable U.S. voltage and frequency (For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V/60Hz is shown in the report.
- (3) The battery is fully-charged during the radited and RF conducted test.

For AC Conducted Emission

	Test Case
AC Conducted Emission	Mode 4: Keeping BLE TX

2.3 TEST SOFTWARE AND POWER LEVEL

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

Test software Version	Test program: BLE			
Pluo Cuito 2.2.0	Mode Or Modulation type	Power setting		
BlueSuite_3.2.0	1M	Default		

Report No.: LGT23K118RF04 Page 9 of 49



2.4 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
Power cord	N/A	N/A	N/A	1.8m
Antenna	N/A	N/A	N/A	N/A

Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
Laptop	Lenovo	HKF-16	N/A	N/A

Note:

- (1) For detachable type I/O cable should be specified the length in cm in [®]Length ^a column.
- (2) "YES" is means "with core"; "NO" is means "without core".

Report No.: LGT23K118RF04 Page 10 of 49



2.5 EQUIPMENTS LIST

Conducted Emission							
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until		
EMI Test Receiver	R&S	ESU8	100372	2023.04.13	2024.04.12		
LISN	COM-POWER	LI-115	02032	2023.04.07	2024.04.06		
LISN	SCHWARZBE CK	NNLK 8122	00160	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						

RF Radiated 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 Conducted Test equipment								
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until			
Signal Analyzer	Keysight	N9010B	MY60242508	2023.08.14	2024.08.13			
Signal Analyzer	Keysight	N9020A	MY50530994	2023.10.12	2024.10.10			
RF Automatic Test system	MW	MW200-RFCB	MW220322LG	2023.04.13	2024.04.12			
MXG Vector Signal Generator	Keysight	N5182B	MY59100717	2023.04.07	2024.04.06			
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			
Temperature & Humidity	KTJ	TA218B	N.A	2023.04.24	2024.04.23			
Digital multimeter	MASTECH	MS8261	MBGBC83053	2023.08.14	2024.08.13			
Testing Software		MTS83	10_V2.0.0.0_MW					

Report No.: LGT23K118RF04 Page 11 of 49



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)			
PREQUENCY (MHZ)	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

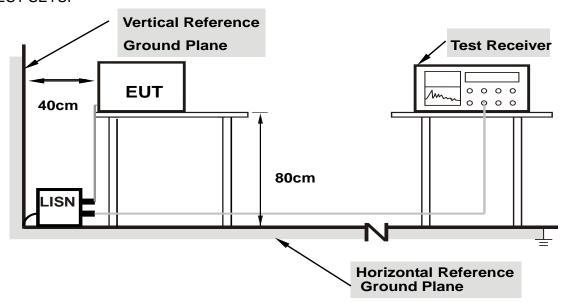
Report No.: LGT23K118RF04 Page 12 of 49



3.2 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.

3.3 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.

3.4 EUT OPERATING CONDITIONS

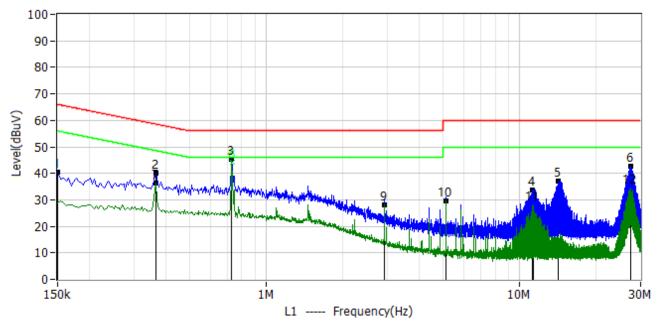
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

Report No.: LGT23K118RF04 Page 13 of 49



3.5 TEST RESULTS

Project: LGT23K118	Test Engineer: LiuH
EUT: Broadcasting amplifier	Temperature: 20.6°C
M/N: MA-BT240	Humidity: 50%RH
Test Voltage: AC 120V/60Hz	Test Data: 2024-01-06
Test Mode: TX BLE 2402	
Note:	

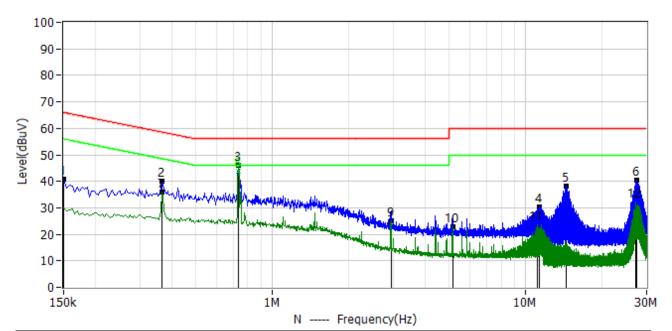


No.	Frequency MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Detector	Polar
1*	0.150	30.12	10.49	40.61	66.00	-25.40	QP	L1
2*	0.366	29.66	10.49	40.15	58.59	-18.44	QP	L1
3*	0.730	34.97	10.51	45.48	56.00	-10.52	QP	L1
4*	11.174	22.63	10.96	33.59	60.00	-26.41	QP	L1
5*	14.186	26.04	11.01	37.05	60.00	-22.95	QP	L1
6*	27.510	31.25	11.29	42.54	60.00	-17.46	QP	L1
7*	0.366	25.66	10.49	36.15	48.59	-12.44	AV	L1
8	0.734	33.51	10.50	44.01	46.00	-1.99	AV	L1
9*	2.922	17.17	10.74	27.91	46.00	-18.09	AV	L1
10*	5.118	18.66	10.80	29.46	50.00	-20.54	AV	L1
11*	11.270	16.95	10.96	27.91	50.00	-22.09	AV	L1
12*	27.510	23.31	11.29	34.60	50.00	-15.40	AV	L1

Report No.: LGT23K118RF04 Page 14 of 49



Project: LGT23K118	Test Engineer: LiuH	•
EUT: Broadcasting amplifier	Temperature: 20.6°C	
M/N: MA-BT240	Humidity: 50%RH	
Test Voltage: AC 120V/60Hz	Test Data: 2024-01-06	
Test Mode: TX BLE 2402	•	
Note:		



No.	Frequency MHz	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Margin dB	Detector	Polar
1*	0.150	30.21	10.49	40.70	66.00	-25.30	QP	N
2*	0.366	29.41	10.49	39.90	58.59	-18.69	QP	N
3*	0.734	35.66	10.51	46.17	56.00	-9.83	QP	N
4*	11.286	19.24	10.99	30.23	60.00	-29.77	QP	N
5*	14.394	27.20	11.06	38.26	60.00	-21.74	QP	N
6*	27.534	28.85	11.43	40.28	60.00	-19.72	QP	N
7*	0.366	25.35	10.49	35.84	48.59	-12.75	AV	N
8	0.734	33.38	10.50	43.88	46.00	-2.12	AV	Ν
9*	2.938	14.31	10.75	25.06	46.00	-20.94	AV	Ν
10*	5.138	12.19	10.81	23.00	50.00	-27.00	AV	N
11*	11.086	12.53	10.98	23.51	50.00	-26.49	AV	N
12*	27.238	20.79	11.42	32.21	50.00	-17.79	AV	N



4. RADIATED EMISSION MEASUREMENT

4.1 RADIATED EMISSION LIMITS

In case the emission fall within the Restricted band specified on Part15.205 (a)&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	Field Strength	Measurement Distance
(MHz)	(micorvolts/meter)	(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

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)		
	PEAK	AVERAGE	
Above 1000	74	54	

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).

LIMITS OF RESTRICTED FREQUENCY BANDS

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

Report No.: LGT23K118RF04 Page 16 of 49



For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AV
Start Frequency	9 KHz/150KHz (Peak/QP/AV)
Stop Frequency	150KHz/30MHz (Peak/QP/AV)
	200Hz (From 9kHz to 0.15MHz)/
RB / VB (emission in restricted	9KHz (From 0.15MHz to 30MHz);
band)	200Hz (From 9kHz to 0.15MHz)/
	9KHz (From 0.15MHz to 30MHz)

Spectrum Parameter	Setting	
Attenuation	Auto	
Detector	Peak/QP	
Start Frequency	30 MHz (Peak/QP)	
Stop Frequency	1000 MHz (Peak/QP)	
RB / VB (emission in restricted	420 KH= / 200 KH=	
band)	120 KHz / 300 KHz	

Spectrum Parameter	Setting	
Attenuation	Auto	
Detector	Peak	
Start Frequency	1000 MHz (Peak/AV)	
Stop Frequency	10th carrier hamonic (Peak/AV)	
RB / VB (emission in restricted	1 MHz / 3 MHz(Peak)	
band)	1 MHz/1/T MHz(AVG)	

For Restricted band

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2310 to 2410 MHz
	Upper Band Edge: 2475 to 2500 MHz
DD / \/D	1 MHz / 3 MHz(Peak)
RB / VB	1 MHz/1/T MHz(AVG)

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

Report No.: LGT23K118RF04 Page 17 of 49



4.2 TEST PROCEDURE

- a. The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization of the antenna are set to make the measurement.
- d. 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 QuasiPeak detector mode will be re-measured.
- e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

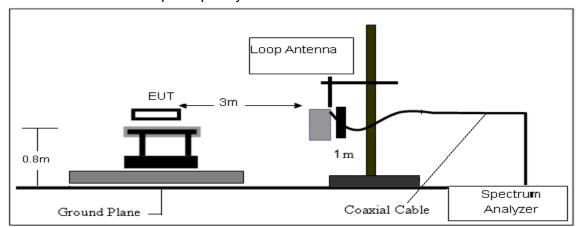
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

Report No.: LGT23K118RF04 Page 18 of 49

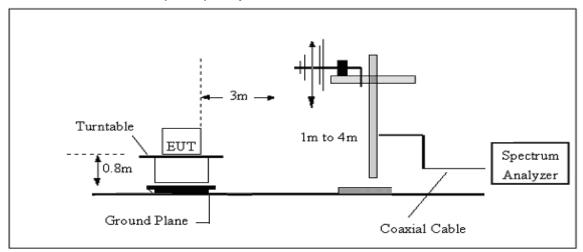


4.3 TEST SETUP

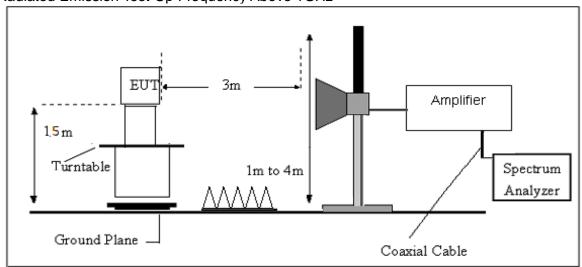
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.4 EUT OPERATING CONDITIONS

Please refer to section 3.4 of this report.

Report No.: LGT23K118RF04 Page 19 of 49



4.5 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBµV/m)	(dBµV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

Factor=AF+CL-AG

Report No.: LGT23K118RF04 Page 20 of 49



4.6 TEST RESULTS

Results of Radiated Emissions (9 KHz~30MHz)

No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Remark
1*	-	-	-	-	-	-	-	See Note

Note:

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

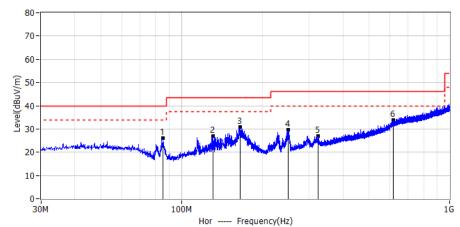
Limit line = specific limits (dBuV) + distance extrapolation factor.

Report No.: LGT23K118RF04 Page 21 of 49

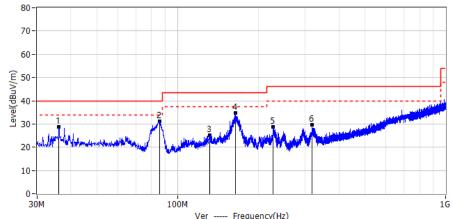


Results of Radiated Emissions (30MHz~1000MHz)

Project: LGT23K118	Test Engineer: Xiangdong Ma
EUT: Broadcasting amplifier	Temperature: 26.5°C
M/N: MA-BT240	Humidity: 50%RH
Test Voltage: AC 120V/60Hz	Test Data: 2024-01-05
Test Mode: TX BLE 2402	
Note:	



No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	85.411	10.95	15.12	26.07	40.00	-13.93	QP	Hor
2*	130.880	8.32	18.55	26.87	43.50	-16.63	QP	Hor
3*	166.043	11.04	19.81	30.85	43.50	-12.65	QP	Hor
4*	249.584	11.45	18.21	29.66	46.00	-16.34	QP	Hor
5*	323.910	6.39	20.67	27.06	46.00	-18.94	QP	Hor
6*	618.063	5.43	28.35	33.78	46.00	-12.22	QP	Hor



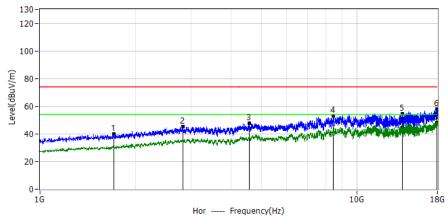
				voi iroquone	()			
No.	Frequency	Reading	Factor	Level	Limit	Margin	Detector	Polar
INO.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Fulai
1*	36.184	9.92	18.74	28.66	40.00	-11.34	QP	Ver
2*	85.654	16.12	15.12	31.24	40.00	-8.76	QP	Ver
3*	132.093	6.46	18.61	25.07	43.50	-18.43	QP	Ver
4*	164.830	14.82	19.81	34.63	43.50	-8.87	QP	Ver
5*	227.638	11.87	16.99	28.86	46.00	-17.14	QP	Ver
6*	318.454	9.15	20.50	29.65	46.00	-16.35	QP	Ver

Report No.: LGT23K118RF04 Page 22 of 49

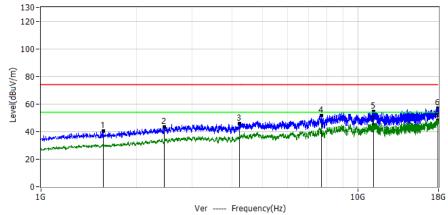


Results of Radiated Emissions (Above 1000MHz)

Project: LGT23K118	Test Engineer: Xiangdong Ma
EUT: Broadcasting amplifier	Temperature: 26.5°C
M/N: MA-BT240	Humidity: 50%RH
Test Voltage: AC 120V/60Hz	Test Data: 2023-12-08
Test Mode: BLE 1M 2402	
Note: Worst Case	



No.	Frequency	Reading	Factor	Level	Limit	Margin	Detector	Polar
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Dottooto.	. 0.0
1*	1711.9000	58.91	-19.10	39.81	74.00	-34.19	PK	Hor
2*	2825.4000	54.57	-9.26	45.31	74.00	-28.69	PK	Hor
3*	4587.0000	53.30	-5.82	47.48	74.00	-26.52	PK	Hor
4*	8448.1000	55.78	-2.73	53.05	74.00	-20.95	PK	Hor
5*	13915.7000	48.95	5.58	54.53	74.00	-19.47	PK	Hor
6*	17946.9000	49.32	8.48	57.80	74.00	-16.20	PK	Hor
7*	13915.7000	39.32	5.58	44.90	54.00	-9.10	AV	Hor
8*	17946.9000	39.72	8.48	48.20	54.00	-5.80	AV	Hor

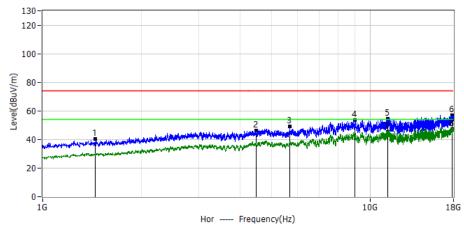


No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1569.5000	60.72	-20.38	40.34	74.00	-33.66	PK	Ver
2*	2453.5000	54.58	-11.47	43.11	74.00	-30.89	PK	Ver
3*	4223.6000	52.81	-6.92	45.89	74.00	-28.11	PK	Ver
4*	7670.4000	55.67	-4.19	51.48	74.00	-22.52	PK	Ver
5*	11244.6000	52.79	1.77	54.56	74.00	-19.44	PK	Ver
6*	17940.5000	48.52	8.48	57.00	74.00	-17.00	PK	Ver
7*	11244.6000	43.23	1.77	45.00	54.00	-9.00	AV	Ver
8*	17940.5000	39.52	8.48	48.00	54.00	-6.00	AV	Ver

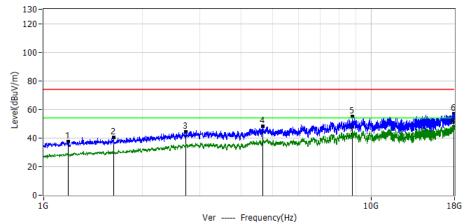
Report No.: LGT23K118RF04 Page 23 of 49



Project: LGT23K118	Test Engineer: Xiangdong Ma
EUT: Broadcasting amplifier	Temperature: 26.5°C
M/N: MA-BT240	Humidity: 50%RH
Test Voltage: AC 120V/60Hz	Test Data: 2023-12-08
Test Mode: BLE 1M 2440	
Note: Worst Case	



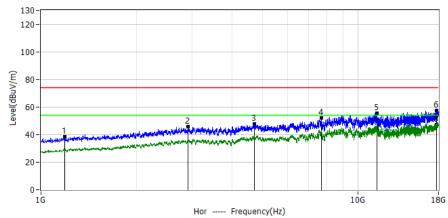
No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1448.4000	61.42	-21.12	40.30	74.00	-33.70	PK	Hor
2*	4480.7000	51.96	-5.84	46.12	74.00	-27.88	PK	Hor
3*	5692.0000	56.62	-7.66	48.96	74.00	-25.04	PK	Hor
4*	9011.2000	54.97	-1.17	53.80	74.00	-20.20	PK	Hor
5*	11344.5000	52.74	1.83	54.57	74.00	-19.43	PK	Hor
6*	17844.9000	48.68	8.41	57.09	74.00	-16.91	PK	Hor
7*	11344.5000	43.37	1.83	45.20	54.00	-8.80	AV	Hor
8*	17844.9000	38.59	8.41	47.00	54.00	-7.00	AV	Hor



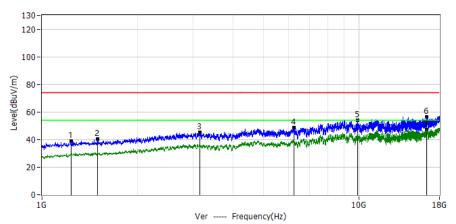
No.	Frequency	Reading	Factor	Level	Limit	Margin	Detector	Polar
INO.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	i olai
1*	1189.1000	60.55	-23.06	37.49	74.00	-36.51	PK	Ver
2*	1635.4000	60.11	-19.84	40.27	74.00	-33.73	PK	Ver
3*	2723.4000	54.29	-9.80	44.49	74.00	-29.51	PK	Ver
4*	4676.2000	54.15	-5.89	48.26	74.00	-25.74	PK	Ver
5*	8777.5000	56.72	-1.80	54.92	74.00	-19.08	PK	Ver
6*	17940.5000	48.33	8.48	56.81	74.00	-17.19	PK	Ver
7*	8777.5000	44.00	-1.80	42.20	54.00	-11.80	AV	Ver
8*	17940.5000	39.12	8.48	47.60	54.00	-6.40	AV	Ver



Project: LGT23K118	Test Engineer: Xiangdong Ma	
EUT: Broadcasting amplifier	Temperature: 26.5°C	
M/N: MA-BT240	Humidity: 50%RH	
Test Voltage: AC 120V/60Hz	Test Data: 2023-12-08	
Test Mode: BLE 1M 2480		
Note: Worst Case		



No.	Frequency	Reading	Factor	Level	Limit	Margin	Detector	Polar
INO.	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Folai
1*	1189.1000	61.42	-23.06	38.36	74.00	-35.64	PK	Hor
2*	2916.7000	54.59	-8.78	45.81	74.00	-28.19	PK	Hor
3*	4720.9000	53.56	-5.93	47.63	74.00	-26.37	PK	Hor
4*	7695.9000	56.15	-4.18	51.97	74.00	-22.03	PK	Hor
5*	11474.1000	53.60	1.91	55.51	74.00	-18.49	PK	Hor
6*	17715.2000	48.99	8.32	57.31	74.00	-16.69	PK	Hor
7*	11474.1000	42.99	1.91	44.90	54.00	-9.10	AV	Hor
8*	17715.2000	38.68	8.32	47.00	54.00	-7.00	AV	Hor



No.	Frequency MHz	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	1233.7000	61.77	-22.70	39.07	74.00	-34.93	PK	Ver
2*	1495.1000	61.18	-20.87	40.31	74.00	-33.69	PK	Ver
3*	3142.0000	53.79	-8.39	45.40	74.00	-28.60	PK	Ver
4*	6238.1000	55.56	-7.08	48.48	74.00	-25.52	PK	Ver
5*	9914.4000	55.07	-1.18	53.89	74.00	-20.11	PK	Ver
6*	16376.5000	49.66	6.85	56.51	74.00	-17.49	PK	Ver
7*	16376.5000	40.35	6.85	47.20	54.00	-6.80	AV	Ver

Remark:

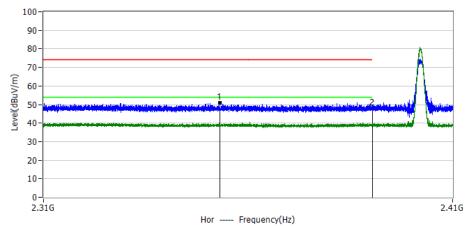
In frequency ranges 18~25GHz no any other harmonic emissions detected which are tested to compliance with the limit. No recording in the test report. No any other emissions level which are attenuated less than 20dB below the limit. No recording in the test report.

Report No.: LGT23K118RF04 Page 25 of 49

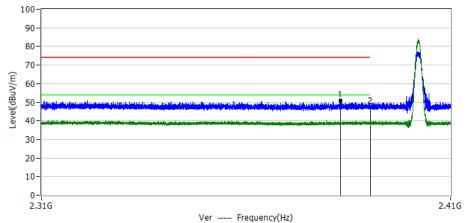


4.7 TEST RESULTS (BAND EDGE REQUIREMENTS)

Project: LGT23K118	Test Engineer: Xiangdong Ma
EUT: Broadcasting amplifier	Temperature: 26.5°C
M/N: MA-BT240	Humidity: 50%RH
Test Voltage: AC 120V/60Hz	Test Data: 2023-12-08
Test Mode: BLE 1M 2402	
Note:	



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.3526GHz	16.83	34.04	50.87	74.00	-23.13	PK	Hor
2*	2.3900GHz	14.15	33.95	48.10	74.00	-25.90	PK	Hor

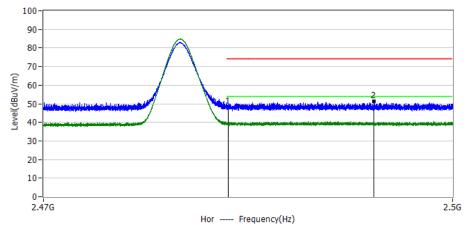


No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.3826GHz	17.11	33.97	51.08	74.00	-22.92	PK	Ver
2*	2.3900GHz	13.65	33.95	47.60	74.00	-26.40	PK	Ver

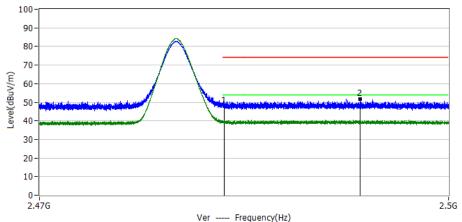
Report No.: LGT23K118RF04 Page 26 of 49



Project: LGT23K118	Test Engineer: Xiangdong Ma
EUT: Broadcasting amplifier	Temperature: 26.5°C
M/N: MA-BT240	Humidity: 50%RH
Test Voltage: AC 120V/60Hz	Test Data: 2023-12-08
Test Mode: BLE 1M 2480	
Note:	



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.4835GHz	14.07	34.13	48.20	74.00	-25.80	PK	Hor
2*	2.4942GHz	17.01	34.15	51.16	74.00	-22.84	PK	Hor



	1 0 7							
No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.4835GHz	13.87	34.13	48.00	74.00	-26.00	PK	Ver
2*	2.4935GHz	17.59	34.15	51.74	74.00	-22.26	PK	Ver

Report No.: LGT23K118RF04 Page 27 of 49



5. CONDUCTED SPURIOUS & BAND EDGE EMISSION

5.1 LIMIT

According to FCC section 15.247(d), 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.

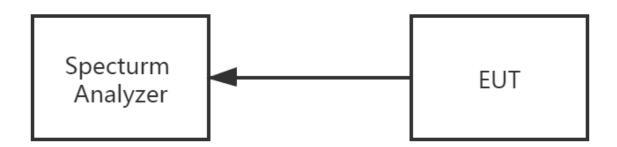
5.2 TEST PROCEDURE

Spectrum Parameter	Setting		
Detector	Peak		
Start/Stop Frequency	30 MHz to 10th carrier harmonic		
RB / VB (emission in restricted band)	100 KHz/300 KHz		
Trace-Mode:	Max hold		

For Band edge

Spectrum Parameter	Setting			
Detector	Peak			
Start/Stan Fraguency	Lower Band Edge: 2300 – 2407 MHz			
Start/Stop Frequency	Upper Band Edge: 2475 – 2500 MHz			
RB / VB (emission in restricted band)	100 KHz/300 KHz			
Trace-Mode:	Max hold			

5.3 TEST SETUP



The EUT which is powered by the battery, is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50 Ohm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

5.4 EUT OPERATION CONDITIONS

Please refer to section 3.4 of this report.

5.5 TEST RESULTS

For the measurement records, refer to the appendix I.

Report No.: LGT23K118RF04 Page 28 of 49



6. POWER SPECTRAL DENSITY TEST

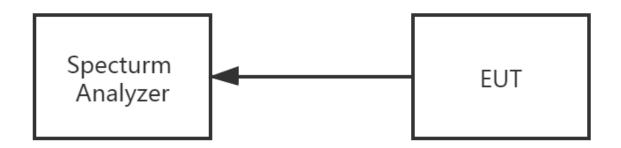
6.1 LIMIT

Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	≤8 dBm (RBW≥3KHz)	2400-2483.5	PASS

6.2 TEST PROCEDURE

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS channel bandwidth.
- 3. Set the RBW to: 100 kHz \geq RBW \geq 3 kHz.
- 4. Set the VBW ≥ 3 x RBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

6.3 TEST SETUP



6.4 EUT OPERATION CONDITIONS

Please refer to section 3.4 of this report.

6.5 TEST RESULTS

For the measurement records, refer to the appendix I.

Report No.: LGT23K118RF04 Page 29 of 49



7. BANDWIDTH TEST

7.1 LIMIT

Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

7.2 TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
IRRW	For 6 dB Bandwidth :100KHz For 99% Bandwidth :1% to 5% of the occupied bandwidth
IVBW	For 6dB Bandwidth : ≥3 × RBW For 99% Bandwidth : approximately 3×RBW
Trace	Max hold
Sweep	Auto

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB and 99% relative to the maximum level measured in the fundamental emission.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

Please refer to section 3.4 of this report.

7.5 TEST RESULTS

For the measurement records, refer to the appendix I.

8. PEAK OUTPUT POWER TEST

8.1 LIMIT

Section	Section Test Item Limit		Frequency Range (MHz)	Result
15.247(b)(3)	Output Power	1 watt or 30dBm	2400-2483.5	PASS

Report No.: LGT23K118RF04 Page 30 of 49



8.2 TEST PROCEDURE

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

RBW ≥ DTS bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- a) Set the RBW ≥ DTS bandwidth.
- b) Set VBW ≥ [3 × RBW].
- c) Set span \geq [3 \times RBW].
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

Integrated band power method:

The following procedure can be used when the maximum available RBW of the instrument is less than the

DTS bandwidth:

- a) Set the RBW = 1 MHz.
- b) Set the VBW \geq [3 \times RBW].
- c) Set the span \geq [1.5 × DTS bandwidth].
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select the peak detector). If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth.

PKPM1 Peak power meter method:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

8.3 TEST SETUP



8.4 EUT OPERATION CONDITIONS

Please refer to section 3.4 of this report.

8.5 TEST RESULTS

For the measurement records, refer to the appendix I.

Report No.: LGT23K118RF04 Page 31 of 49



9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

15.203 For intentional device, according to 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.

9.2 EUT ANTENNA

The EUT antenna is External Antenna. It comply with the standard requirement.

Report No.: LGT23K118RF04 Page 32 of 49



10. FREQUENCY STABILITY

10.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/-0.02% of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage and for a variation in primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees.

10.2 TEST PROCEDURE

- 1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- 2. Turn the EUT on and couple its output to spectrum analyzer.
- 3. Turn the EUT off and set the chamber to the highest temperature specified.
- 4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2,5 and 10 minutes.
- 5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- 6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

10.3 TEST RESULT

For the measurement records, refer to the appendix I.

Report No.: LGT23K118RF04 Page 33 of 49



APPENDIX I - TEST RESULTS

Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	BLE 1M	2402	Ant1	63.68	1.96	2.51
NVNT	BLE 1M	2440	Ant1	63.71	1.96	2.51
NVNT	BLE 1M	2480	Ant1	63.68	1.96	2.51

Report No.: LGT23K118RF04 Page 34 of 49







Maximum Average Conducted Output Power

Conditi	on Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	6.05	1.96	8.01	30	Pass
NVNT	BLE 1M	2440	Ant1	5.28	1.96	7.24	30	Pass
NVNT	BLE 1M	2480	Ant1	5.97	1.96	7.93	30	Pass

Report No.: LGT23K118RF04 Page 36 of 49



Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	8.37	30	Pass
NVNT	BLE 1M	2440	Ant1	7.85	30	Pass
NVNT	BLE 1M	2480	Ant1	8.16	30	Pass

Report No.: LGT23K118RF04 Page 37 of 49



-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.704	0.5	Pass
NVNT	BLE 1M	2440	Ant1	0.707	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.713	0.5	Pass

Report No.: LGT23K118RF04 Page 38 of 49







Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	1.039
NVNT	BLE 1M	2440	Ant1	1.04
NVNT	BLE 1M	2480	Ant1	1.039

Report No.: LGT23K118RF04 Page 40 of 49







Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	BLE 1M	2402	Ant1	-6.74	8	Pass
NVNT	BLE 1M	2440	Ant1	-7.23	8	Pass
NVNT	BLE 1M	2480	Ant1	-6.84	8	Pass

Report No.: LGT23K118RF04 Page 42 of 49





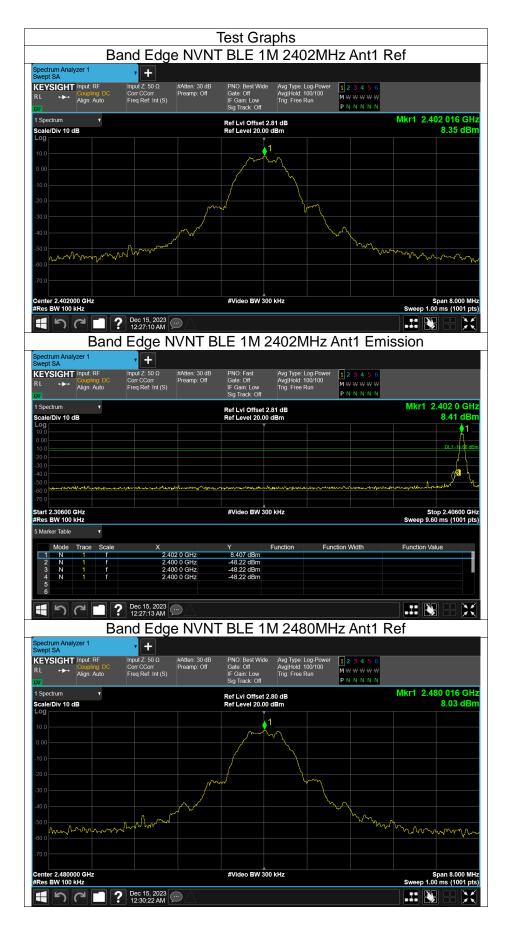


Band Edge

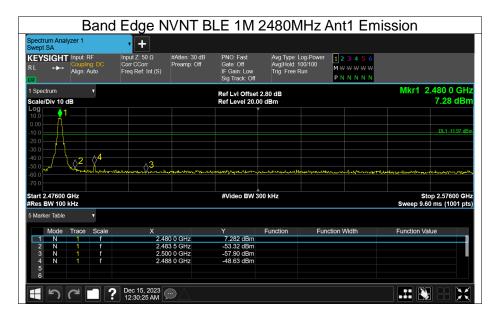
Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-56.57	-20	Pass
NVNT	BLE 1M	2480	Ant1	-56.65	-20	Pass

Report No.: LGT23K118RF04 Page 44 of 49











Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-60.92	-20	Pass
NVNT	BLE 1M	2440	Ant1	-63.58	-20	Pass
NVNT	BLE 1M	2480	Ant1	-65.02	-20	Pass

Report No.: LGT23K118RF04 Page 47 of 49









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

Report No.: LGT23K118RF04 Page 49 of 49