



BUREAU VERITAS

Test Report No.: RF170724N040



# TEST REPORT

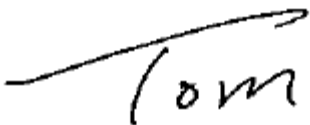

Applicant	Sam Ash Music Corporation
Address	262 Duffy Avenue Hicksville, NY 11801 USA

Manufacturer or Supplier	Sam Ash Music Corporation
Address	262 Duffy Avenue Hicksville, NY 11801 USA
Product	Professional Wireless System for Mobile Video
Brand Name	SAMSON
Model	GMM
Additional Model & Model Difference	N/A
Date of tests	Jul. 25, 2017 ~ Jul. 31, 2017

the tests have been carried out according to the requirements of the following standard:

**FCC Part 15, Subpart C, Section 15.247**

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

Tested by Tom Chen Project Engineer / EMC Department	Approved by Glyn He Supervisor/ EMC Department
	  Date: Aug. 10, 2017

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



# TABLE OF CONTENTS

**RELEASE CONTROL RECORD ..... 4**

**1 SUMMARY OF TEST RESULTS..... 5**

**2 MEASUREMENT UNCERTAINTY ..... 5**

**3 GENERAL INFORMATION ..... 6**

3.1 GENERAL DESCRIPTION OF EUT ..... 6

3.2 DESCRIPTION OF TEST MODES ..... 7

3.2.1. CONFIGURATION OF SYSTEM UNDER TEST ..... 7

3.2.2. TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL..... 7

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS ..... 10

3.4 DESCRIPTION OF SUPPORT UNITS ..... 10

**4 TEST TYPES AND RESULTS.....11**

4.1 CONDUCTED EMISSION MEASUREMENT .....11

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....11

4.1.2 TEST INSTRUMENTS .....11

4.1.3 TEST PROCEDURES ..... 12

4.1.4 DEVIATION FROM TEST STANDARD..... 12

4.1.5 TEST SETUP ..... 13

4.1.6 EUT OPERATING CONDITIONS ..... 13

4.1.7 TEST RESULTS..... 14

4.2 RADIATED EMISSION MEASUREMENT ..... 16

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT..... 16

4.2.2 TEST INSTRUMENTS ..... 17

4.2.3 TEST PROCEDURES ..... 18

4.2.4 DEVIATION FROM TEST STANDARD..... 18

4.2.5 TEST SETUP ..... 19

4.2.6 EUT OPERATING CONDITIONS ..... 20

4.2.7 TEST RESULTS..... 21

4.3 6DB BANDWIDTH MEASUREMENT ..... 26

4.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT ..... 26

4.3.2 TEST INSTRUMENTS ..... 26

4.3.3 TEST PROCEDURE ..... 26

4.3.4 DEVIATION FROM TEST STANDARD ..... 27

4.3.5 TEST SETUP ..... 27

4.3.6 EUT OPERATING CONDITIONS..... 27

4.3.7 TEST RESULTS ..... 28



4.4	CONDUCTED OUTPUT POWER.....	29
4.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	29
4.4.2	TEST SETUP .....	29
4.4.3	TEST INSTRUMENTS .....	29
4.3.4	TEST PROCEDURES.....	30
4.4.5	DEVIATION FROM TEST STANDARD.....	30
4.3.6	EUT OPERATING CONDITIONS.....	30
4.4.7	TEST RESULTS .....	30
4.4.7.1	MAXIMUM PEAK OUTPUT POWER.....	30
4.4	POWER SPECTRAL DENSITY MEASUREMENT .....	31
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	31
4.5.2	TEST SETUP .....	31
4.5.3	TEST INSTRUMENTS.....	31
4.5.4	TEST PROCEDURE .....	31
4.5.5	DEVIATION FROM TEST STANDARD.....	31
4.5.6	EUT OPERATING CONDITION.....	31
4.5.7	TEST RESULTS.....	32
4.6	OUT OF BAND EMISSION MEASUREMENT .....	33
4.6.1	LIMITS OF OUT OF BAND EMISSION MEASUREMENT .....	33
4.6.2	TEST SETUP .....	33
4.6.3	TEST INSTRUMENTS.....	33
4.6.4	TEST PROCEDURE .....	33
4.6.5	DEVIATION FROM TEST STANDARD.....	34
4.6.6	EUT OPERATING CONDITION.....	34
4.6.7	TEST RESULTS.....	35
5	<b>PHOTOGRAPHS OF THE TEST CONFIGURATION .....</b>	<b>36</b>
6	<b>APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....</b>	<b>37</b>



**BUREAU** Test Report No.: RF170724N040  
**VERITAS**

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF170724N040	Original release	Aug. 10, 2017



# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.205 15.209	Radiated Emission	PASS	Meet the requirement of limit.
15.247(d)	Out of band Emission Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used

# 2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	3.10dB
	30MHz ~ 1GMHz	3.42dB
	1GHz ~ 18GHz	4.58dB
	18GHz ~ 40GHz	4.58dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Professional Wireless System for Mobile Video
<b>MODEL NO.</b>	GMM
<b>FCC ID</b>	CCRGMM
<b>NOMINAL VOLTAGE</b>	DC 3.7V From Li-ion Battery or DC 5V From USB Port
<b>MODULATION TYPE</b>	DSSS
<b>MODULATION TECHNOLOGY</b>	GFSK
<b>OPERATING FREQUENCY</b>	2406-2478MHz
<b>OUTPUT POWER(PEAK)</b>	51.642mW (Maximum)
<b>ANTENNA TYPE</b>	Integral Antenna, -6dBi Gain
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	Micro USB Cable: Unshielded, detachable, 0.3m Aux in cable: Unshielded, detachable, 0.3m Lightning cable: Unshielded, detachable, 0.3m Type 'C' cable: Unshielded, detachable, 0.3m

**NOTE:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions, but only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 170724N040) for detailed product photo.
4. The EUT can powered by the adaptor as listed below:

<b>ADAPTER</b>	
<b>BRAND:</b>	Ktoc
<b>MODEL:</b>	KSAS0050500100D5U
<b>INPUT:</b>	AC 100-240V, 50/60Hz, 0.16A
<b>OUTPUT:</b>	DC 5V/1A
<b>DC LINE:</b>	Unshielded, detachable, 1m



### 3.2 DESCRIPTION OF TEST MODES

25 channels are provided for GFSK:

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	<b>2406</b>	10	2436	20	2466
1	2409	11	2439	21	2469
2	2412	<b>12</b>	<b>2442</b>	22	2472
3	2415	13	2445	23	2475
4	2418	14	2448	<b>24</b>	<b>2478</b>
5	2421	15	2451		
6	2424	16	2454		
7	2427	17	2457		
8	2430	18	2460		
9	2433	19	2463		

#### 3.2.1. CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

#### 3.2.2. TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports  
 The worst case was found when positioned on X axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
<b>A</b>	-	-	-	√	<b>Powered By Battery+ BT Link</b>
<b>B</b>	√	√	√	-	<b>Powered By USB Port + BT Link</b>

Where **RE<1G**: Radiated Emission below 1GHz      **RE≥1G**: Radiated Emission above 1GHz  
**PLC**: Power Line Conducted Emission      **APCM**: Antenna Port Conducted Measurement



**RADIATED EMISSION TEST (BELOW 1GHz):**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	0 to 24	24	DSSS	GFSK	1

For the test results, only the worst case was shown in test report.

**RADIATED EMISSION TEST (ABOVE 1GHz):**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	0 to 24	0,12, 24	DSSS	GFSK	1

**POWER LINE CONDUCTED EMISSION TEST:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	0 to 24	24	DSSS	GFSK	1





**ANTENNA PORT CONDUCTED MEASUREMENT:**

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	0 to 24	0,12, 24	DSSS	GFSK	1

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	25deg. C, 50%RH	DC 5V From USB Port	Jerry
RE≥1G	25deg. C, 50%RH	DC 5V From USB Port	Jerry
PLC	25deg. C, 60%RH	DC 5V From USB Port	Lueng
APCM	20deg. C, 55%RH	DC 3.7V From Battery	Jerry



### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C, Section 15.247**

**558074 D01 DTS Meas Guidance v04**

**ANSI C63.10-2013**

All test items have been performed and recorded as per the above standards.

### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together without other necessary accessories or support units.



## 4 TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
  2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
  3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 07, 2017	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 07, 2017	1 Year
3.	L.I.S.N	Schwarzbeck	NNLK8129	8129-212	Mar. 07, 2017	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 07, 2017	1 Year
5.	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	26115-010-0007	Mar. 07, 2017	1 Year

- NOTE:**
1. The test was performed in the Dongguan NTC Co., Ltd that was accredited by CNAS.
  2. The test was performed in 553 Room.



#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

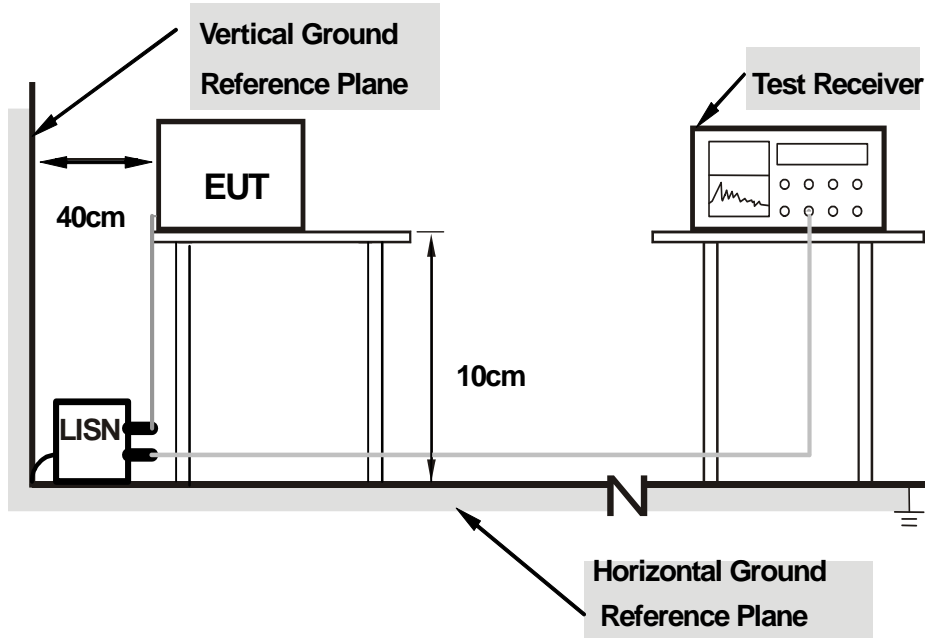
**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.1.5 TEST SETUP



**Note: 1.Support units were connected to second LISN.**

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 10cm from other units and other metal planes**

For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

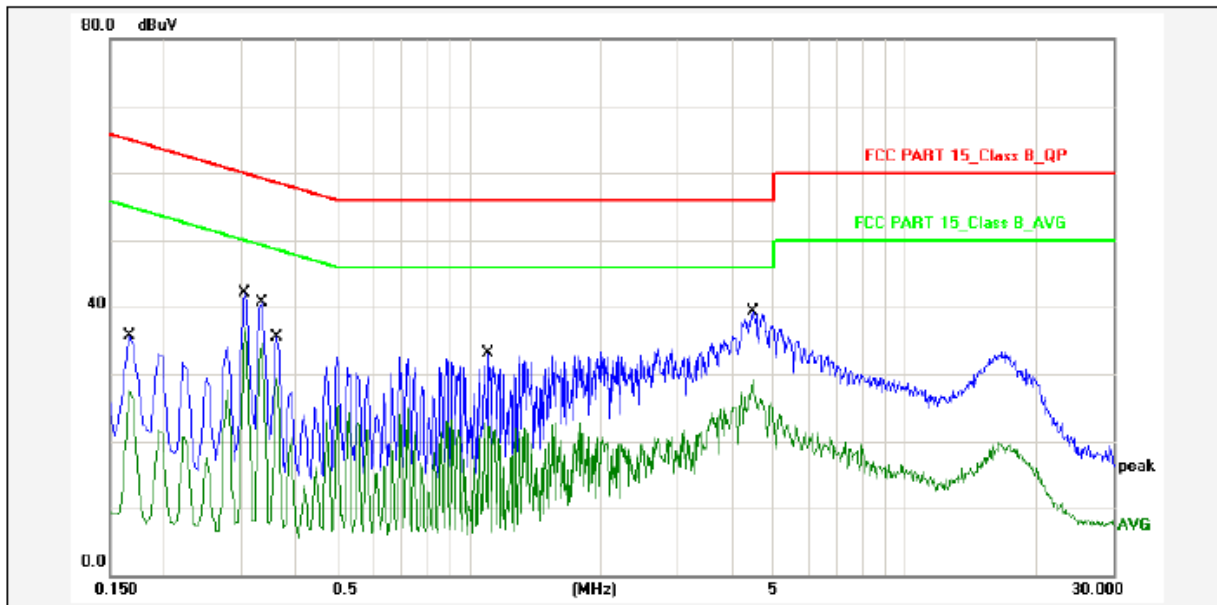


### 4.1.7 TEST RESULTS

**CONDUCTED WORST-CASE DATA:**

<b>PHASE</b>	Line	<b>6dB BANDWIDTH</b>	9kHz
--------------	------	----------------------	------

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1660	10.80	23.00	33.80	65.15	-31.35	QP	P	
2	0.1660	10.80	14.80	25.60	55.15	-29.55	AVG	P	
3	0.3060	10.80	29.40	40.20	60.08	-19.88	QP	P	
4	0.3060	10.80	24.10	34.90	50.08	-15.18	AVG	P	
5	0.3339	10.80	27.90	38.70	59.35	-20.65	QP	P	
6	0.3339	10.80	21.90	32.70	49.35	-16.65	AVG	P	
7	0.3620	10.80	22.60	33.40	58.68	-25.28	QP	P	
8	0.3620	10.80	16.50	27.30	48.68	-21.38	AVG	P	
9	1.1100	10.80	20.40	31.20	56.00	-24.80	QP	P	
10	1.1100	10.80	9.90	20.70	46.00	-25.30	AVG	P	
11	4.4618	10.80	26.50	37.30	56.00	-18.70	QP	P	
12	4.4618	10.80	16.30	27.10	46.00	-18.90	AVG	P	



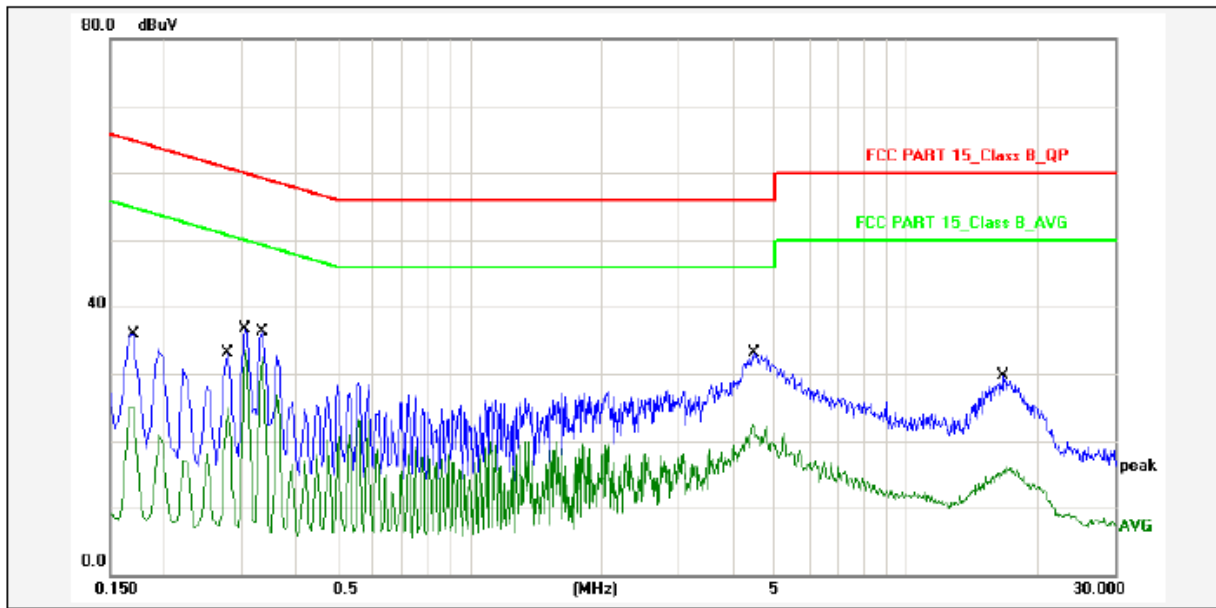


**BUREAU  
VERITAS**

**Test Report No.: RF170724N040**

<b>PHASE</b>	Neutral	<b>6dB BANDWIDTH</b>	9kHz
--------------	---------	----------------------	------

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1700	10.80	23.10	33.90	64.96	-31.06	QP	P	
2	0.1700	10.80	12.20	23.00	54.96	-31.96	AVG	P	
3	0.2779	10.80	20.30	31.10	60.88	-29.78	QP	P	
4	0.2779	10.80	12.10	22.90	50.88	-27.98	AVG	P	
5	0.3060	10.80	24.00	34.80	60.08	-25.28	QP	P	
6	0.3060	10.80	20.60	31.40	50.08	-18.68	AVG	P	
7	0.3339	10.80	23.60	34.40	59.35	-24.95	QP	P	
8	0.3339	10.80	19.70	30.50	49.35	-18.85	AVG	P	
9	4.4939	10.80	20.40	31.20	56.00	-24.80	QP	P	
10	4.4939	10.80	9.80	20.60	46.00	-25.40	AVG	P	
11	16.7459	10.80	16.90	27.70	60.00	-32.30	QP	P	
12	16.7459	10.80	3.30	14.10	50.00	-35.90	AVG	P	



**Bureau Veritas Shenzhen Co., Ltd.  
Dongguan Branch**

No. 34, Chenwulu Section, Guantai Rd., Houjie  
Town, Dongguan City,  
Guangdong 523942, China

Tel: +86 769 8593 5656  
Fax: +86 769 8593 1080  
Email: [customerservice.dg@cn.bureauveritas.com](mailto:customerservice.dg@cn.bureauveritas.com)



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/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

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



**4.2.2 TEST INSTRUMENTS**

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 11,17	Mar. 10,18
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 04,16	Nov. 03,17
Bilog Antenna (30MHz~1GHz)	Teseq	CBL 6111D	30643	Jul. 14, 17	Jul. 13, 18
Loop antenna (9KHz ~30MHz)	Daze	ZN30900A	0708	Mar. 12,17	Mar. 11,18
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Mar. 04,17	Mar. 03, 18
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 19,17	May 18,18
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 08, 16	Aug. 07, 17
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 06,17	Mar. 05,18
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Horn Antenna (18GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 15,17	Mar. 14,18
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	Mar. 06,17	Mar. 05,18
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 04,16	Nov. 03,17
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug. 08,16	Aug. 07,17
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A	N/A

**NOTE:**

1. The test was performed in BVDG\_966 Chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 749762.



#### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its 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.
- d. 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
- 4.All modes of operation were investigated and the worst-case emissions are reported.
- 5.The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

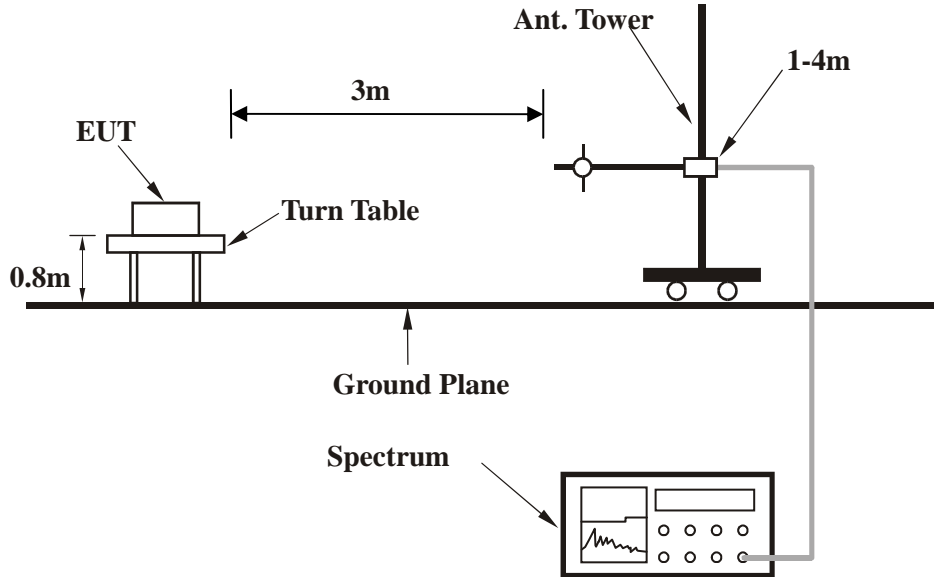
#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.



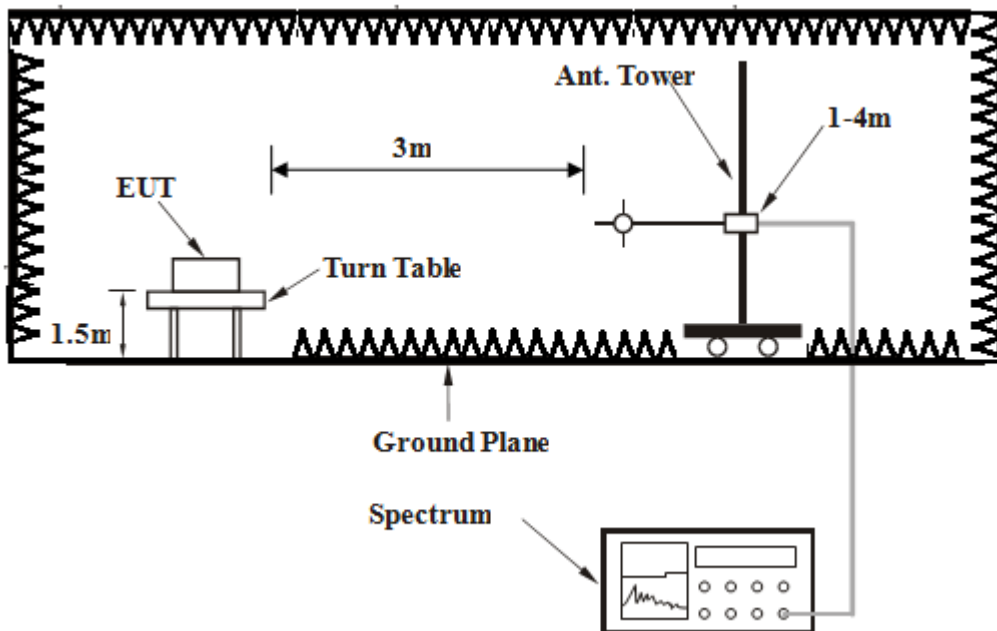
### 4.2.5 TEST SETUP

#### Below 1GHz test setup



**Note:** For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### Above 1GHz test setup



**Note:** For the actual test configuration, please refer to the attached file (Test Setup Photo).



**BUREAU  
VERITAS**

**Test Report No.: RF170724N040**

#### 4.2.6 EUT OPERATING CONDITIONS

- a. Set the EUT under full load condition and placed them on a testing table.
- b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the EUT in full functions.



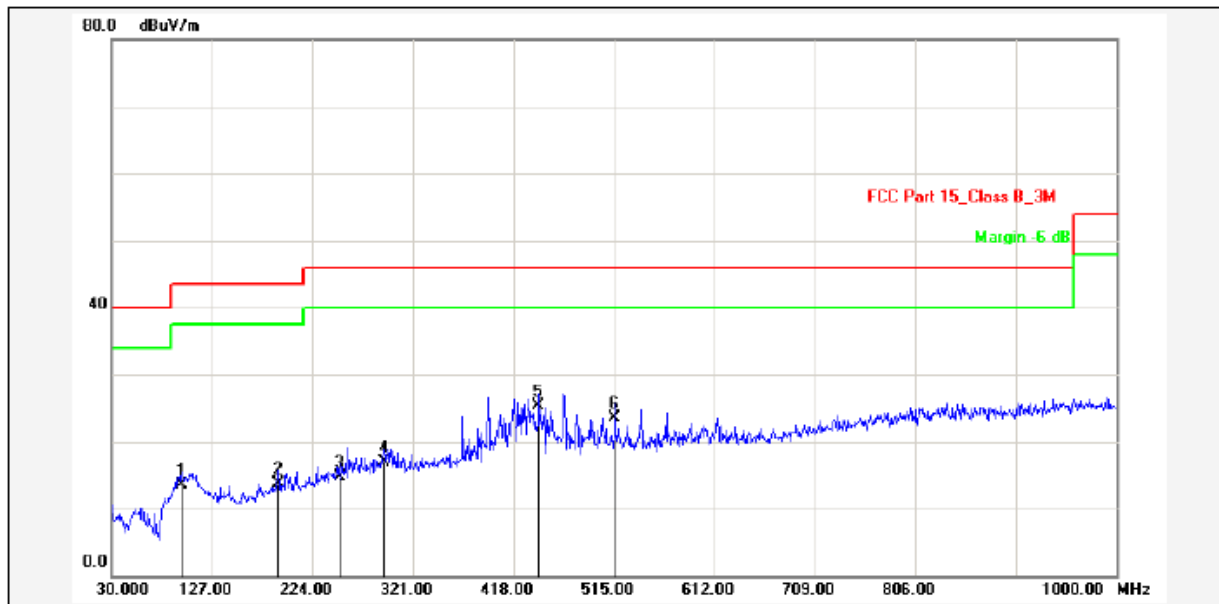
### 4.2.7 TEST RESULTS

#### BELOW 1GHz WORST-CASE DATA:

<b>CHANNEL</b>	TX Channel 24	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9KHz ~ 1GHz		

Horizontal

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	97.9000	-12.40	25.90	13.50	43.50	-30.00	QP
2	191.0200	-13.54	27.34	13.80	43.50	-29.70	QP
3	250.1899	-11.69	26.39	14.70	46.00	-31.30	QP
4	292.8700	-10.67	27.57	16.90	46.00	-29.10	QP
5	442.2500	-8.16	33.46	25.30	46.00	-20.70	QP
6	515.9699	-6.73	30.33	23.60	46.00	-22.40	QP





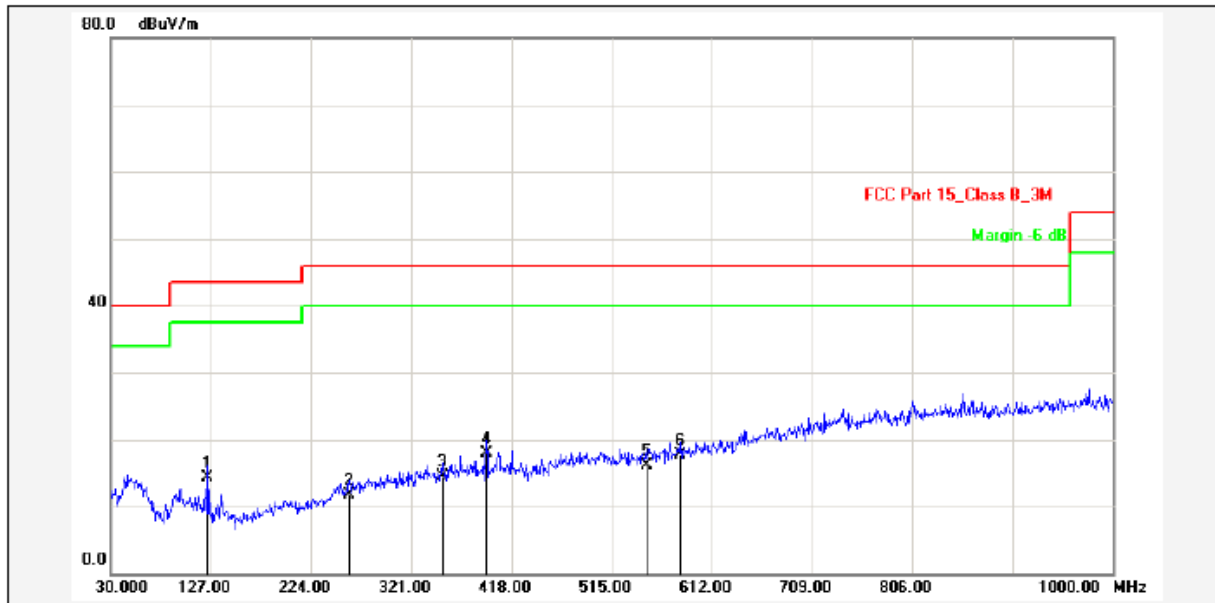
**BUREAU  
VERITAS**

**Test Report No.: RF170724N040**

<b>CHANNEL</b>	TX Channel 24	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9KHz ~ 1GHz		

Vertical

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	124.0900	-17.51	31.81	14.30	43.50	-29.20	QP
2	260.8599	-13.41	25.21	11.80	46.00	-34.20	QP
3	351.0699	-11.12	25.62	14.50	46.00	-31.50	QP
4	393.7500	-11.14	29.04	17.90	46.00	-28.10	QP
5	548.9500	-8.57	24.77	16.20	46.00	-29.80	QP
6	581.9299	-7.51	25.21	17.70	46.00	-28.30	QP



**Bureau Veritas Shenzhen Co., Ltd.  
Dongguan Branch**

No. 34, Chenwulu Section, Guantai Rd., Houjie  
Town, Dongguan City,  
Guangdong 523942, China

Tel: +86 769 8593 5656  
Fax: +86 769 8593 1080  
Email: [customerservice.dg@cn.bureauveritas.com](mailto:customerservice.dg@cn.bureauveritas.com)



**ABOVE 1GHz TEST DATA:**

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

**Horizontal**

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.000	0.09	45.09	45.18	74.00	-28.82	peak
2	2390.000	0.09	33.51	33.60	54.00	-20.40	AVG
3	2400.000	0.13	62.65	62.78	74.00	-11.22	peak
4	2400.000	0.13	50.05	50.18	54.00	-3.82	AVG
5	4812.000	6.34	50.84	57.18	74.00	-16.82	peak
6	4812.000	6.34	39.05	45.39	54.00	-8.61	AVG
7	7218.000	10.46	45.72	56.18	74.00	-17.82	peak
8	7218.000	10.46	33.83	44.29	54.00	-9.71	AVG
9	9624.000	12.44	45.93	58.37	74.00	-15.63	peak
10	9624.000	12.44	34.54	46.98	54.00	-7.02	AVG

**Vertical**

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390.000	0.09	44.09	44.18	74.00	-29.82	peak
2	2390.000	0.09	32.39	32.48	54.00	-21.52	AVG
3	2400.000	0.13	59.65	59.78	74.00	-14.22	peak
4	2400.000	0.13	47.55	47.68	54.00	-6.32	AVG
5	4812.000	6.34	46.84	53.18	74.00	-20.82	peak
6	4812.000	6.34	35.35	41.69	54.00	-12.31	AVG
7	7218.000	10.46	49.59	60.05	74.00	-13.95	peak
8	7218.000	10.46	37.83	48.29	54.00	-5.71	AVG
9	9624.000	12.44	45.62	58.06	74.00	-15.94	peak
10	9624.000	12.44	33.95	46.39	54.00	-7.61	AVG



<b>CHANNEL</b>	TX Channel 12	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

**Horizontal**

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4884.000	6.61	50.55	57.16	74.00	-16.84	peak
2	4884.000	6.61	39.06	45.67	54.00	-8.33	AVG
3	7326.000	10.54	49.66	60.20	74.00	-13.80	peak
4	7326.000	10.54	37.55	48.09	54.00	-5.91	AVG
5	9768.000	12.85	49.62	62.47	74.00	-11.53	peak
6	9768.000	12.85	37.33	50.18	54.00	-3.82	AVG

**Vertical**

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4884.000	6.61	46.07	52.68	74.00	-21.32	peak
2	4884.000	6.61	33.96	40.57	54.00	-13.43	AVG
3	7326.000	10.54	50.64	61.18	74.00	-12.82	peak
4	7326.000	10.54	39.13	49.67	54.00	-4.33	AVG
5	9768.000	12.85	47.72	60.57	74.00	-13.43	peak
6	9768.000	12.85	35.22	48.07	54.00	-5.93	AVG





<b>CHANNEL</b>	TX Channel 24	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

**Horizontal**

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.560	0.34	46.95	47.29	74.00	-26.71	peak
2	2483.560	0.34	35.05	35.39	54.00	-18.61	AVG
3	4956.000	6.88	44.21	51.09	74.00	-22.91	peak
4	4956.000	6.88	32.91	39.79	54.00	-14.21	AVG
5	7434.000	10.59	48.50	59.09	74.00	-14.91	peak
6	7434.000	10.59	37.39	47.98	54.00	-6.02	AVG
7	9912.000	13.10	48.35	61.45	74.00	-12.55	peak
8	9912.000	13.10	36.27	49.37	54.00	-4.63	AVG

**Vertical**

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.560	0.34	45.74	46.08	74.00	-27.92	peak
2	2483.560	0.34	33.84	34.18	54.00	-19.82	AVG
3	4956.000	6.88	47.41	54.29	74.00	-19.71	peak
4	4956.000	6.88	35.90	42.78	54.00	-11.22	AVG
5	7434.000	10.59	51.43	62.02	74.00	-11.98	peak
6	7434.000	10.59	39.64	50.23	54.00	-3.77	AVG
7	9912.000	13.10	47.18	60.28	74.00	-13.72	peak
8	9912.000	13.10	35.29	48.39	54.00	-5.61	AVG



### 4.3 6DB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Receiver	Rohde & Schwarz	ESC17	100837	Mar. 06, 2017	Mar. 05, 2018
DC Power Source	HUA YI	HY5003-2	N/A	Nov.02, 2016	Nov.01, 2017
Temperature & Humidity Chamber	HAIDA	DH-225T	N/A	Nov.04, 2016	Nov.03, 2017
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 06, 2017	Mar. 05, 2018
Pre-Amplifier	COM-Power	PAM-118	443007	Mar. 06, 2017	Mar. 05, 2018
Pre-Amplifier	Agilent	8449B	3008A02964	Nov.02, 2016	Nov.01, 2017
Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 06, 2017	Mar. 05, 2018
Power Sensor	DARE	RPR3006W	15100041SNO64	Mar. 06, 2017	Mar. 05, 2018
Test Software	Acentest	AT890-SW	N/A	N/A	N/A
Cable	Huber+Suhner	CIL02	N/A	Mar. 06, 2017	Mar. 05, 2018
Communication Tester	Rohde & Schwarz	CMW500	149004	Mar. 07, 2017	Mar. 07, 2018
Bluetooth tester	Rohde & Schwarz	CBT	248SGB20D	Mar. 07, 2017	Mar. 07, 2018

**NOTE:**

1. The test was performed in the Dongguan NTC Co., Ltd that was accredited by CNAS.

#### 4.3.3 TEST PROCEDURE

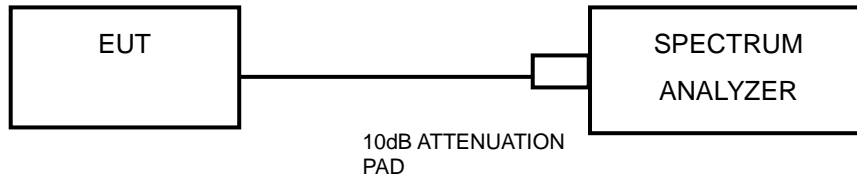
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITIONS

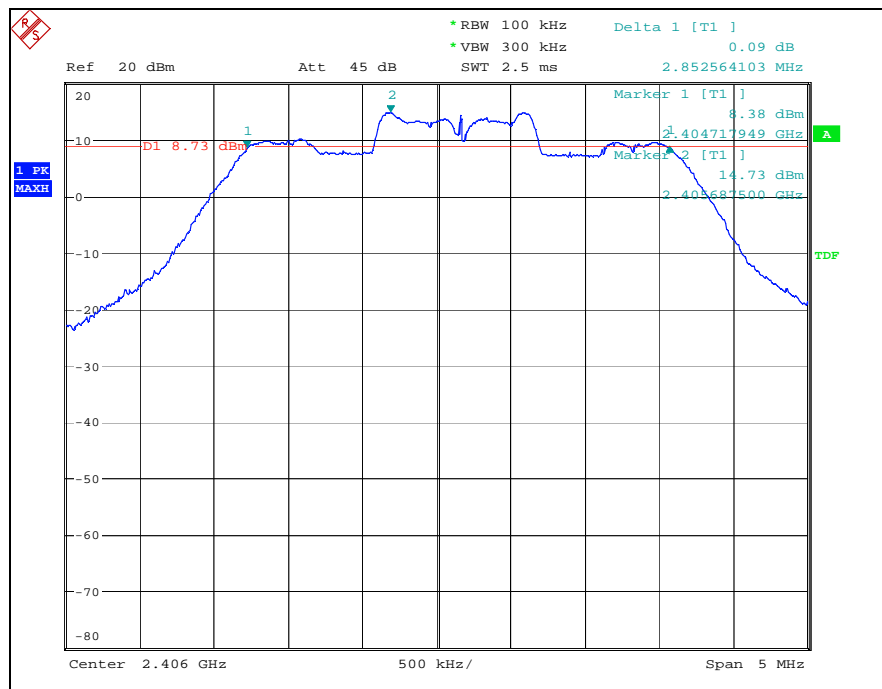
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



### 4.3.7 TEST RESULTS

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
0	2406	2.853	0.5	PASS
12	2442	2.441	0.5	PASS
24	2478	2.477	0.5	PASS

#### WORST PLOT



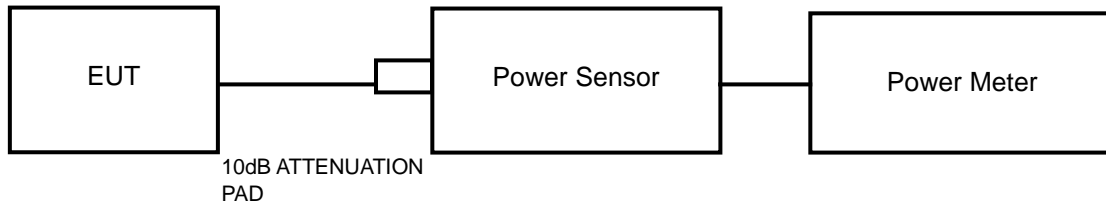


#### 4.4 CONDUCTED OUTPUT POWER

##### 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

##### 4.4.2 TEST SETUP



##### 4.4.3 TEST INSTRUMENTS

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 06, 2017	Mar. 05, 2018
DC Power Source	HUA YI	HY5003-2	N/A	Nov.02, 2016	Nov.01, 2017
Temperature & Humidity Chamber	HAIDA	DH-225T	N/A	Nov.04, 2016	Nov.03, 2017
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 06, 2017	Mar. 05, 2018
Pre-Amplifier	COM-Power	PAM-118	443007	Mar. 06, 2017	Mar. 05, 2018
Broadband Antenna	Schwarzbeck	VULB9162	9162-010	Apr. 25, 2017	Apr. 24, 2018
Pre-Amplifier	Agilent	8449B	3008A02964	Nov.02, 2016	Nov.01, 2017
Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 06, 2017	Mar. 05, 2018
Power Sensor	DARE	RPR3006W	15I00041SNO64	Mar. 06, 2017	Mar. 05, 2018
Test Software	Acentest	AT890-SW	N/A	N/A	N/A
Cable	Huber+Suhner	CIL02	N/A	Mar. 06, 2017	Mar. 05, 2018
Communication Tester	Rohde & Schwarz	CMW500	149004	Mar. 07, 2017	Mar. 07, 2018
Bluetooth tester	Rohde & Schwarz	CBT	248SGB20D	Mar. 07, 2017	Mar. 07, 2018

**NOTE:**

1. The test was performed in the Dongguan NTC Co., Ltd that was accredited by CNAS.



#### 4.3.4 TEST PROCEDURES

A peak sensor was used on the output port of the EUT. A peak power meter was used to read the response of the peak power sensor. Record the peak power level.

#### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### 4.4.7 TEST RESULTS

##### 4.4.7.1 MAXIMUM PEAK OUTPUT POWER

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
0	2406	17.13	51.642	1	PASS
12	2442	16.98	49.888	1	PASS
24	2478	16.12	40.926	1	PASS

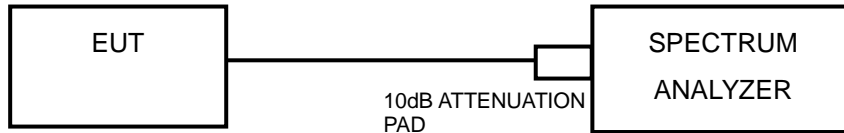


#### 4.4 POWER SPECTRAL DENSITY MEASUREMENT

##### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

##### 4.5.2 TEST SETUP



##### 4.5.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

##### 4.5.4 TEST PROCEDURE

1. Set the span to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW  $\geq 3 \times$  RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

##### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

##### 4.5.6 EUT OPERATING CONDITION

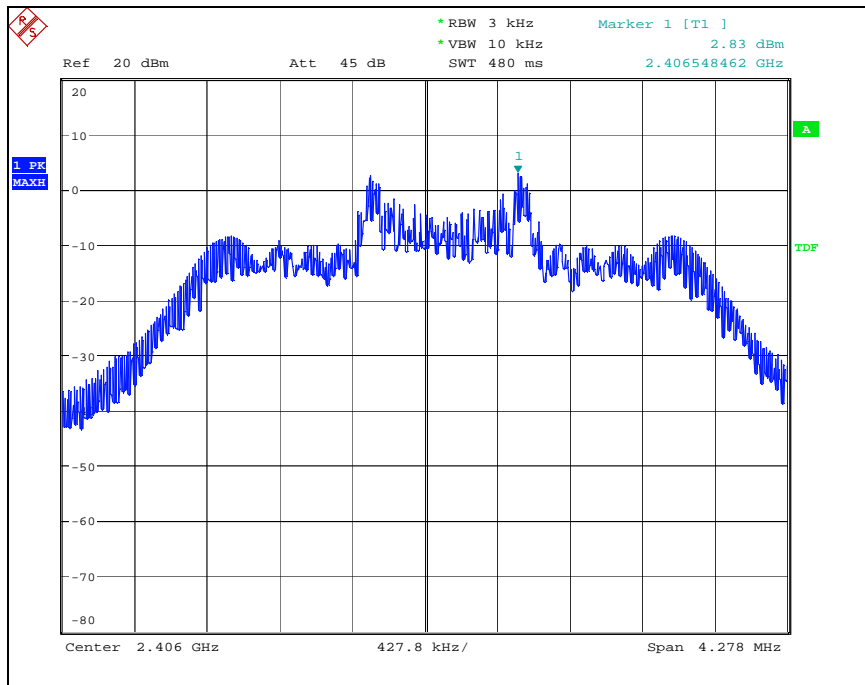
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



### 4.5.7 TEST RESULTS

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	2406	2.83	8	PASS
12	2442	2.58	8	PASS
24	2478	0.82	8	PASS

### WORST PLOT





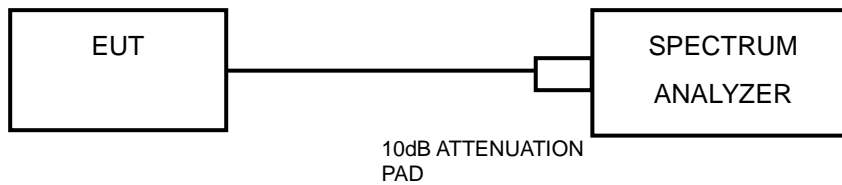


## 4.6 OUT OF BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST SETUP



### 4.6.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

### 4.6.4 TEST PROCEDURE

#### MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.



## MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

### 4.6.5 DEVIATION FROM TEST STANDARD

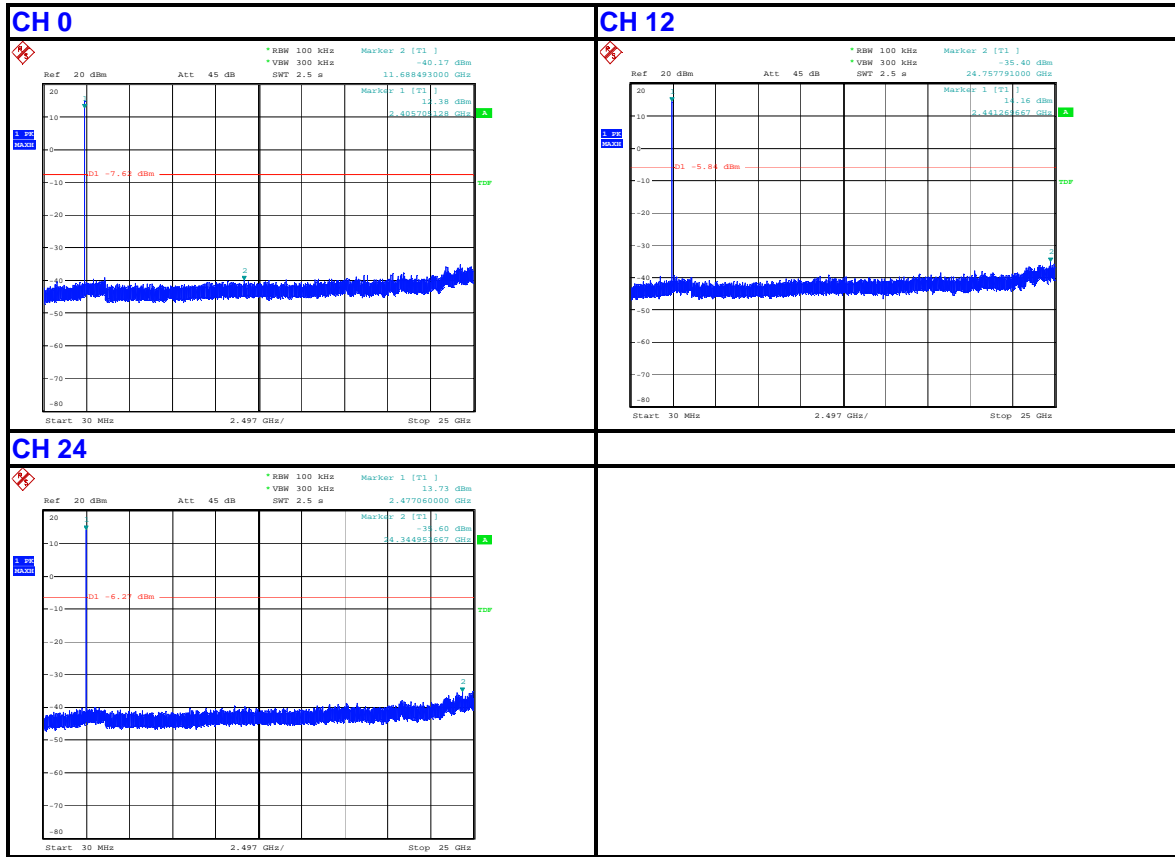
No deviation.

### 4.6.6 EUT OPERATING CONDITION

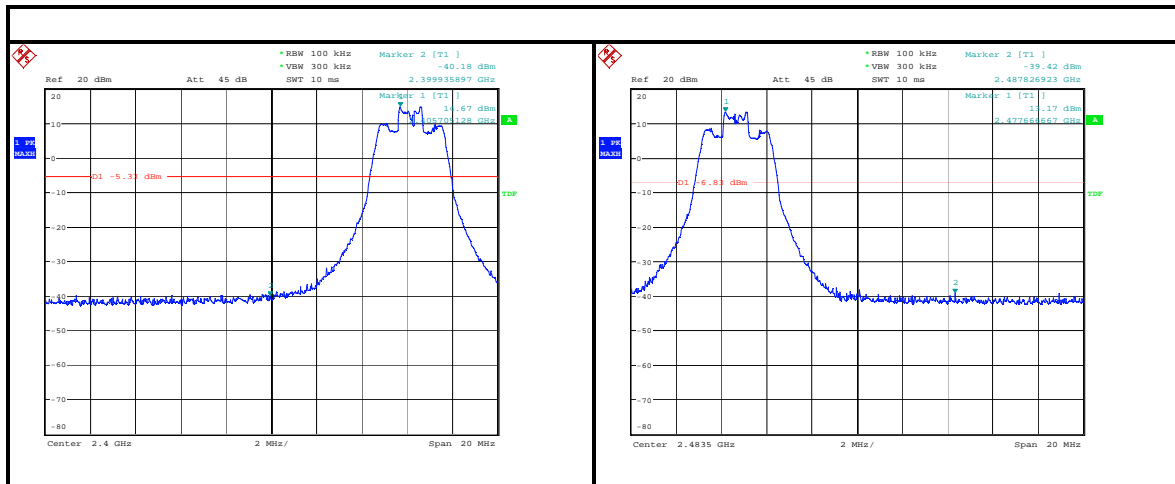
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



### 4.6.7 TEST RESULTS



### Band Edge:





**BUREAU** Test Report No.: RF170724N040  
**VERITAS**

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



**BUREAU** Test Report No.: RF170724N040  
**VERITAS**

## 6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---