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Test Report No.: W7L-241104W001RF01



Certificate #6613.01

# FCC TEST REPORT

## (Part 15, Subpart C)

Applicant:	Shenzhen Jimi IoT Co., Ltd.
Address:	3-4/F, Block A, Building #7, Shenzhen International Innovation Valley, Dashi 1st Road, Nanshan District, Shenzhen, Guangdong, China

Manufacturer or Supplier:	Shenzhen Jimi IoT Co., Ltd.
Address:	3-4/F, Block A, Building #7, Shenzhen International Innovation Valley, Dashi 1st Road, Nanshan District, Shenzhen, Guangdong, China
Product:	Remote Control
Brand Name:	Jimi IoT
Model Name:	KC208
FCC ID:	2AMLF-KC208
Date of tests:	Nov. 05, 2024 ~ Nov. 29, 2024

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

FCC Part 15, Subpart C, Section 15.247

ANSI C63.10-2020

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

Prepared by Hanwen Xu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department

Date: Nov. 29, 2024      Date: Nov. 29, 2024

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended 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. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; 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.



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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-241104W001RF01	Original release	Nov. 29, 2024



## 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
15.207	AC Power Conducted Emission	N/A (note)
15.205 15.209	Radiated Emissions	Compliance
15.247(d)	Out of band Emission Measurement	Compliance
15.247(a)(2)	6dB bandwidth	Compliance
15.247(b)	Conducted Output power	Compliance
15.247(e)	Power Spectral Density	Compliance
15.203	Antenna Requirement	Compliance

**NOTE:** Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

### \*Test Lab Information Reference

#### Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

#### Lab Address:

Tower N, Innovation Center, 88 Zhuyi Road, High-tech District, Suzhou City, Anhui Province

#### Accredited Test Lab Cert 6613.01

The FCC Site Registration No. is 434559; The Designation No. is CN1325.

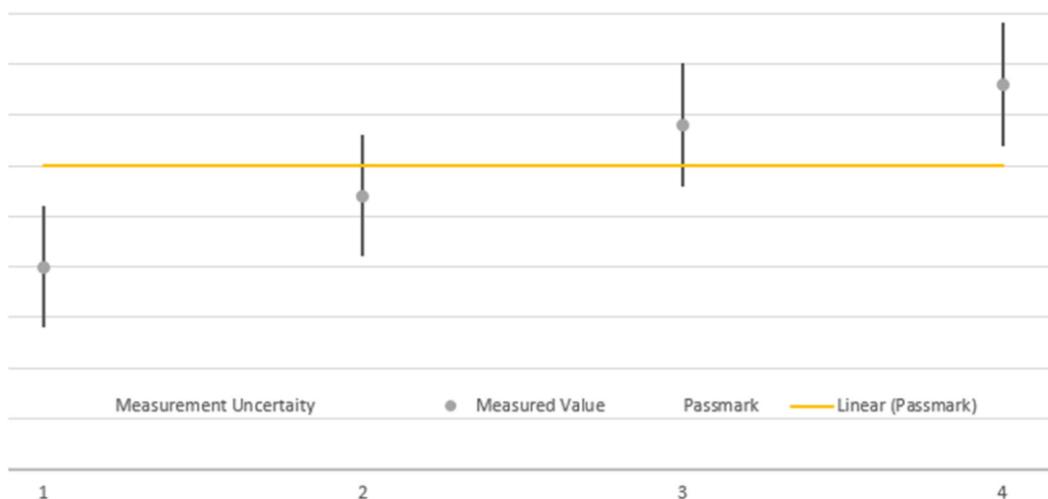


## 1.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (9KHz~30MHz)	±2.68dB
Radiated emissions (30MHz~1GHz)	±4.98dB
Radiated emissions (1GHz ~6GHz)	±4.70dB
Radiated emissions (6GHz ~18GHz)	±4.60dB
Radiated emissions (18GHz ~40GHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Power Spectral Density	±0.85 dB

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



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	above pass mark	within pass mark	Failed
4	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.



## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

PRODUCT*	Remote Control
BRAND NAME*	Jimi IoT
MODEL NAME*	KC208
NOMINAL VOLTAGE*	3.0Vdc (battery)
MODULATION	GFSK
TRANSMISSION RATE	BT_LE: 1 Mbps
OPERATING FREQUENCY	2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	BT-LE: 6.04mW (Maximum)
ANTENNA TYPE*	PCB Antenna with 1.99dBi gain
HW VERSION*	KC208-MB-V1.1
SW VERSION*	KC208_NA_V10_240607
I/O PORTS*	Refer to user's manual
CABLE SUPPLIED*	N/A

**NOTE:**

1. \*Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. The EUT incorporates a SISO function. Physically, the EUT provides one transmitter and one receiver.
4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
5. Antenna gain and EUT conducted cable loss are provided by the customer, and the laboratory will record the results based on these items that involve these two parameters.

MODULATION MODE	TX/RX FUNCTION
BT_LE(1MHz)	1TX /1RX



6.

## 2.2 DESCRIPTION OF TEST MODES

40 channels are provided for BT-LE (GFSK):

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480



## 2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 4 photographs of the test configuration for reference.

## 2.2.2 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 Y 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				MODE
	RE<1G	RE≥1G	PLC	APCM	
-	√	√	-	√	-

Where **RE<1G**: Radiated Emission below 1GHz **RE≥1G**: Radiated Emission above 1GHz

**PLC**: Power Line Conducted Emission

**APCM**: Antenna Port Conducted Measurement

**NOTE:** No need to concern of Conducted Emission due to the EUT is powered by battery.

### 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 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	DATA RATE (Mbps)
BT-LE	0 to 39	19	GFSK	1.0



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#### **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 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	DATA RATE (Mbps)
BT-LE	0 to 39	0,19, 39	GFSK	1.0

#### **POWER LINE CONDUCTED EMISSION TEST**

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	DATA RATE (Mbps)
BT-LE	0 to 39	19	GFSK	1.0

#### **BANDEdge MEASUREMENT:**

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	DATA RATE (Mbps)
BT-LE	0 to 39	0,19, 39	GFSK	1.0

#### **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	DATA RATE (Mbps)
BT-LE	0 to 39	0,19, 39	GFSK	1.0



**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	23deg. C, 70%RH	DC 3.0V By PC	Hanwen Xu
RE≥1G	23deg. C, 70%RH	DC 3.0V By PC	Hanwen Xu
APCM	25deg. C, 60%RH	DC 3.0V By PC	Hanwen Xu



## 2.3 DUTY CYCLE OF TEST SIGNAL

Please Refer to Appendix Of this test report.

### WORST-CASE DATA:

Measured Duty Cycle		
Mode	Duty Cycle [%]	
ANT1		
BT LE	BT4.0	100

Note:

When the test signal duty cycle is less than 98%, the duty factor needs to be considered. When the test signal duty cycle is greater than or equal to 98%, the duty factor does not need to be considered.



## 2.4 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**

**KDB 558074 D01 DTS Meas Guidance v05r02**

**ANSI C63.10-2020**

Note :

1. All test items have been performed and recorded as per the above standards.
2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

## 2.5 DESCRIPTION OF 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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	Thinkpad E14	SL10W47313	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A



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### 3 TEST TYPES AND RESULTS

#### 3.1 RADIATED EMISSION MEASUREMENT

##### 3.1.1 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 (dB<sub>uV/m</sub>) = 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.



### 3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.29,24	Aug.28,26
Pre-Amplifier	R&S	SCU08F1	101028	Jan.22,24	Jan.21,26
Signal Generator	R&S	SMB100A	182185	Mar.29,24	Mar.28,26
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESW44	101973	Mar.28,24	Mar.27,26
Bilog Antenna	SCHWARZBEC K	VULB 9163	1264	Dec.26,23	Dec.25,25
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.21,24	Aug.20,26
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Jul.15,24	Jul.14,26
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.21,24	Aug.20,26
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.22,24	Feb.21,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.19,24	Jun.18,26
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	N/A	N/A
DC Source	HYELEC	HY3010B	551016	Aug.30,24	Aug.29,26
Hygrothermograph	DELI	20210528	SZ014	Sep.05,24	Sep.04,26
6DB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W12.14	N/A	Apr.27,24	Apr.26,25

**NOTE:**

1. The calibration interval of the above test instruments is 12 /24/ 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 3m Chamber.
3. The FCC Site Registration No. is 434559; The Designation No. is CN1325.



### 3.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. 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 (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ( $10 \log(1/\text{duty cycle})$ ).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

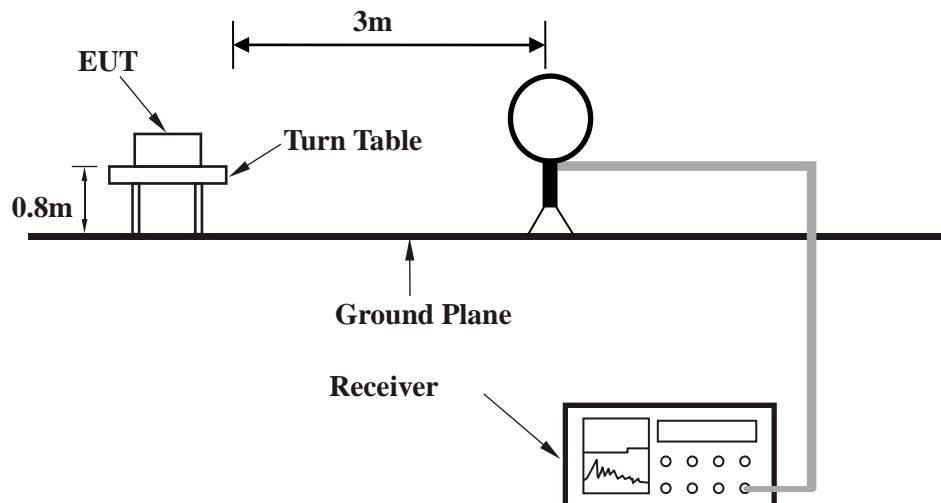
### 3.1.4 DEVIATION FROM TEST STANDARD

No deviation

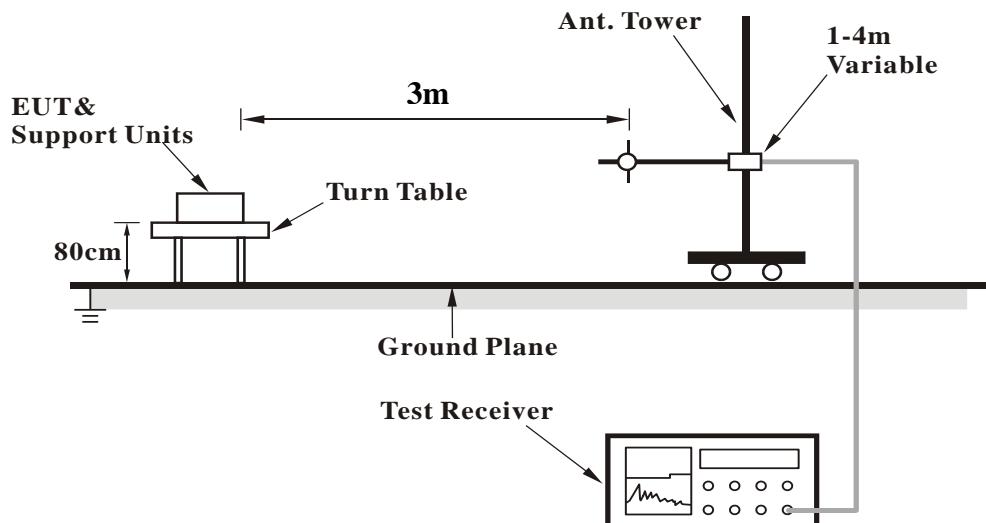


### 3.1.5 TEST SETUP

<Frequency Range 9KHz~30MHz >

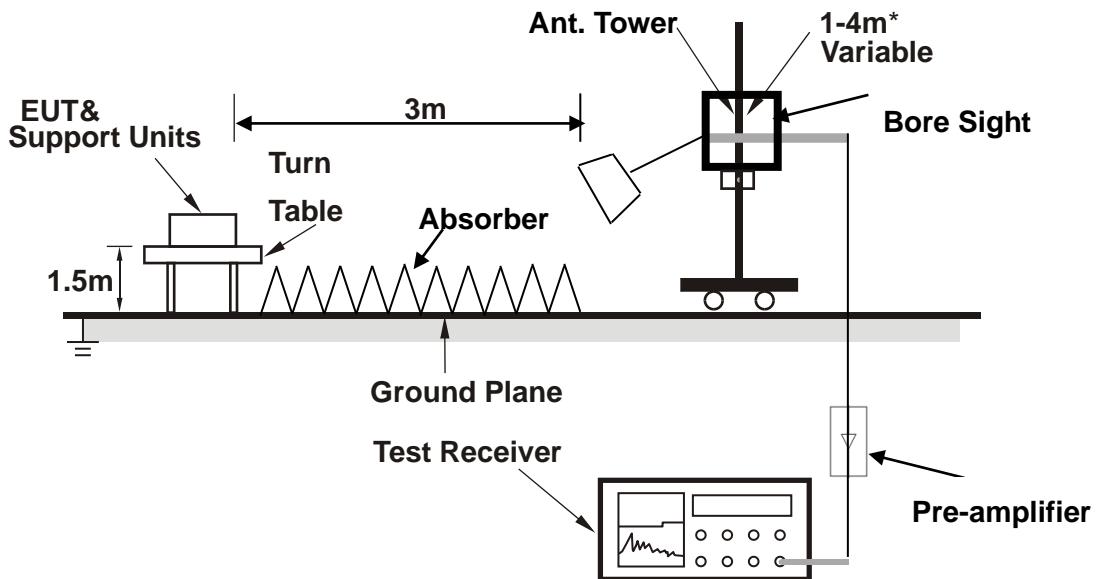


< Frequency Range 30MHz~1GHz >





<Frequency Range above 1GHz>



**Note:** Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

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

### 3.1.6 EUT OPERATING CONDITIONS

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

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### 3.1.7 TEST RESULTS

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

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

30 MHz – 1GHz data:

BT-LE \_1M

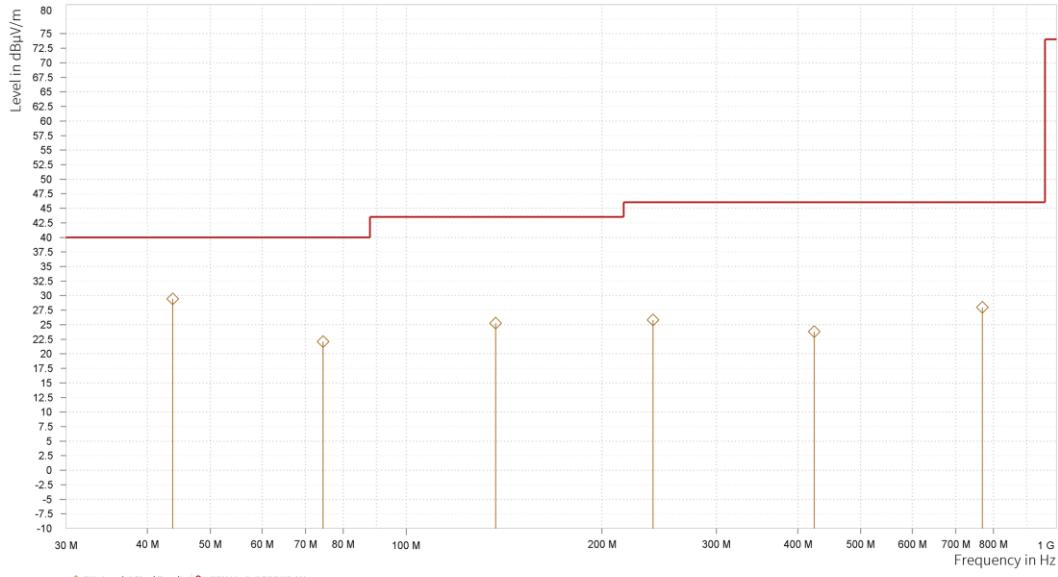
<b>CHANNEL</b>	TX Channel 19	<b>0DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	30MHz ~ 1GHz		

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+: QPK Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	43.774	29.43	40.0	10.57	-11.94	H	359.0	2.0
1	74.475	22.1	40.0	17.9	-17.66	H	127.4	1.0
1	137.234	25.24	43.5	18.26	-17.08	H	98.8	2.0
1	239.617	25.82	46.0	20.18	-11.91	H	231.5	2.0
1	424.111	23.81	46.0	22.19	-8.74	H	98.8	2.0
1	769.189	27.97	46.0	18.03	-3.52	H	1.0	1.0

#### REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value–Emission level.





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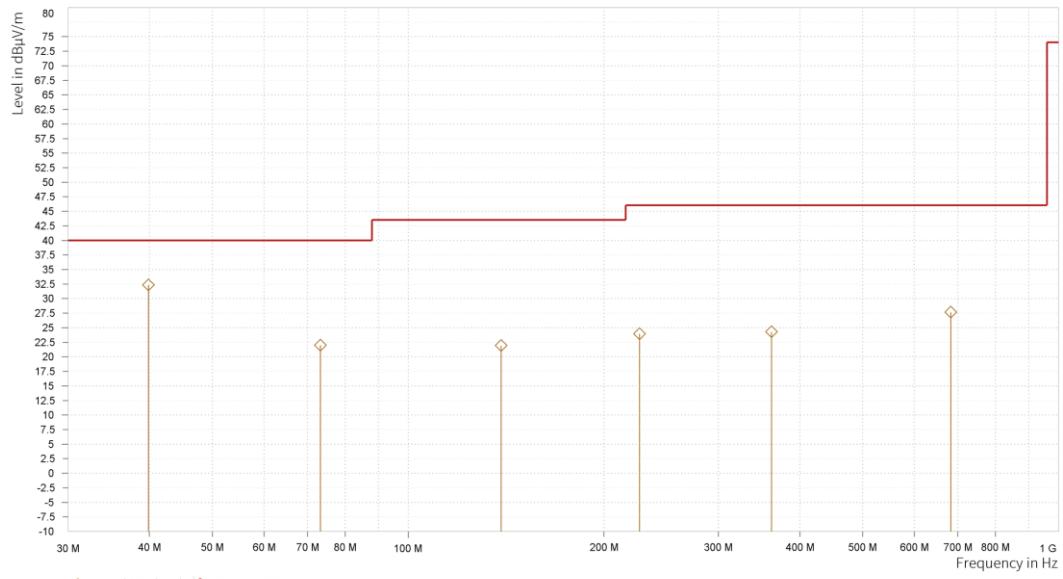
CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+: QPK Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	39.846	32.32	40.0	7.68	-12.76	V	231.5	2.0
1	73.262	21.98	40.0	18.02	-17.37	V	127.4	1.0
1	138.98	21.92	43.5	21.58	-17.11	V	1.6	2.0
1	226.862	23.94	46.0	22.06	-12.35	V	231.5	2.0
1	362.031	24.28	46.0	21.72	-10.02	V	127.4	1.0
1	682.713	27.65	46.0	18.35	-5.03	V	0.9	2.0

#### REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Limit value–Emission level.





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## ABOVE 1GHz TEST DATA

**Note:** 1. For radiated emissions testing , the full testing range of different modes have been scanned , only the worst case harmonic data is reported in the sheet.

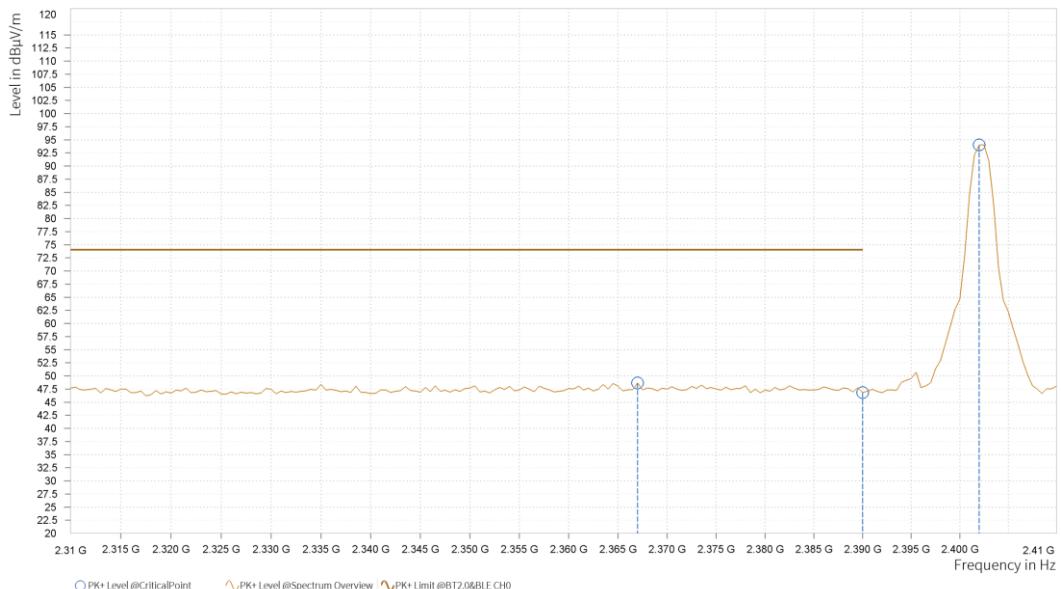
2. All other emissions were greater than 20dB below the limit was not recorded

### BT-LE \_1M:

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

### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+ Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,367.000	48.69	74.0	25.31	9.41	H	359.0	2.0
5	2,390.000	46.83	74.0	27.17	9.34	H	58.1	2.0
5	2,402.000	94.01			9.28	H	5.1	1.0





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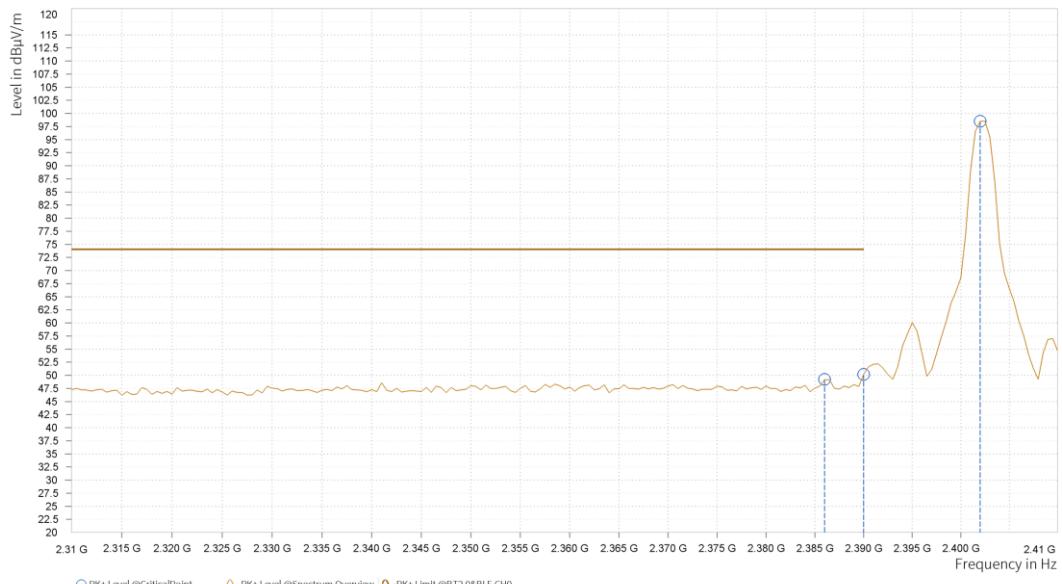
Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,386.000	35.73	54.0	18.27	9.36	H	5.1	1.0
5	2,390.000	33.12	54.0	20.88	9.34	H	1.0	1.0
5	2,402.000	93.01			9.28	H	5.1	1.0





ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+ Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,386.000	49.2	74.0	24.8	9.36	V	355.6	2.0
5	2,390.000	50.18	74.0	23.82	9.34	V	114.3	2.0
5	2,402.000	98.5			9.28	V	114.3	2.0

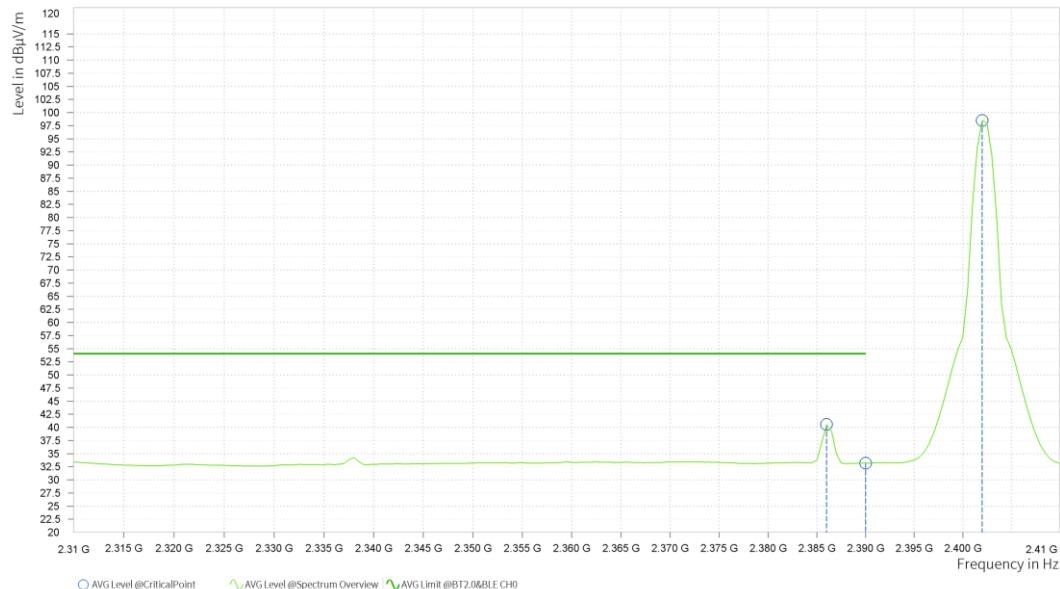




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Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,386.000	40.54	54.0	13.46	9.36	V	108.3	2.0
5	2,390.000	33.21	54.0	20.79	9.34	V	108.3	2.0
5	2,402.000	98.52			9.28	V	108.3	2.0



## REMARKS:

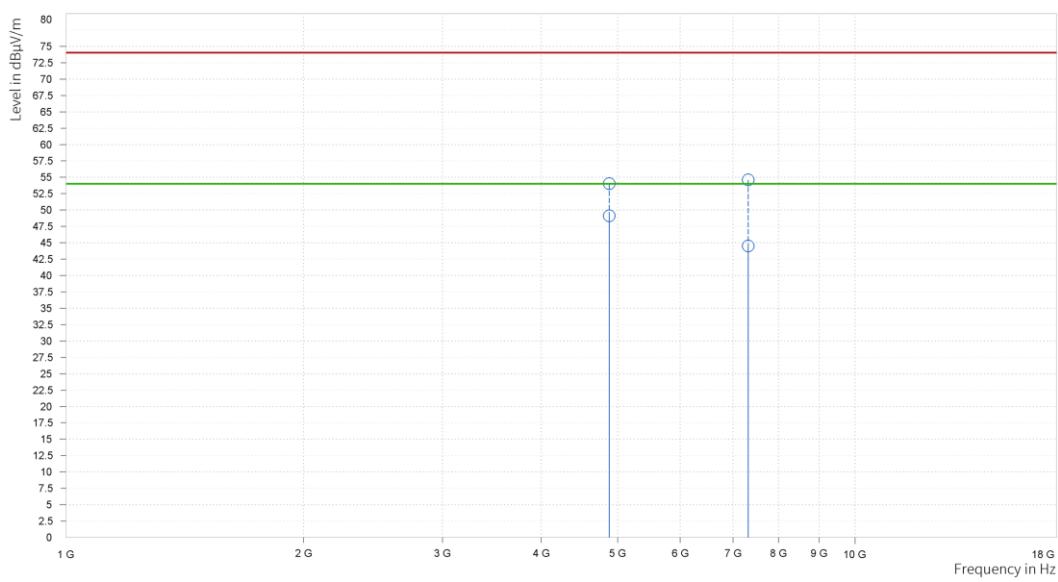
1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor  
Margin value = Limit value-Emission level.
2. 2402MHz: Fundamental frequency.



CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+: QPK Limit [dB $\mu$ V/m]	PK+ Margin [dB]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	Avg Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,880.000	54.02	74.0	19.98	49.13	54.0	4.87	13.72	H	115.5	2.0
3	7,320.000	54.6	74.0	19.4	44.52	54.0	9.48	17.86	H	0.9	2.0



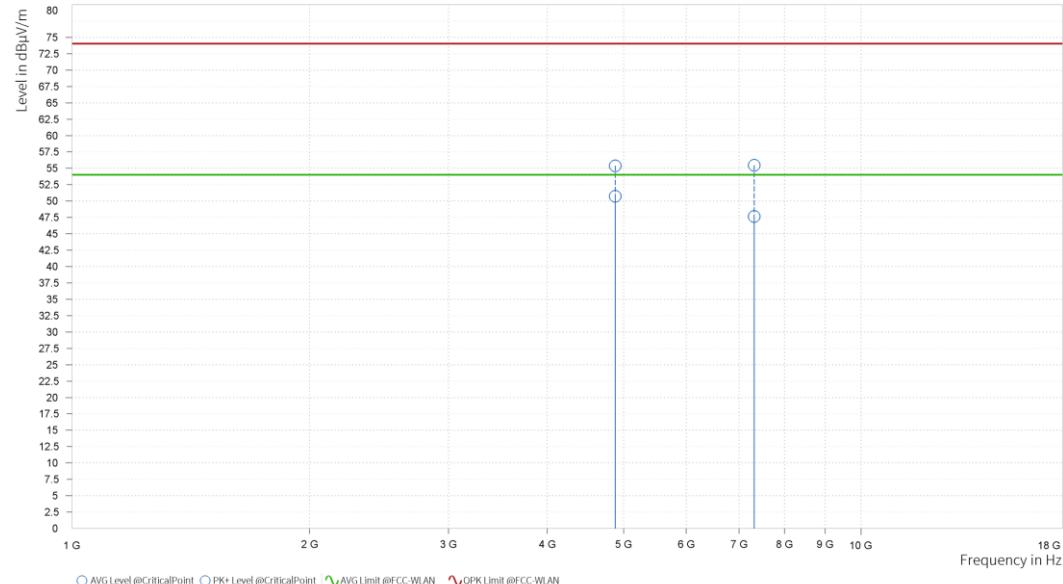


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ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+: QPK Limit [dB $\mu$ V/m]	PK+ Margin [dB]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,880.000	55.37	74.0	18.63	50.73	54.0	3.27	13.72	V	359.0	2.0
3	7,320.000	55.47	74.0	18.53	47.65	54.0	6.35	17.86	V	110.8	2.0



**REMARKS:**

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor  
Margin value = Limit value-Emission level.
2. 2440MHz: Fundamental frequency.



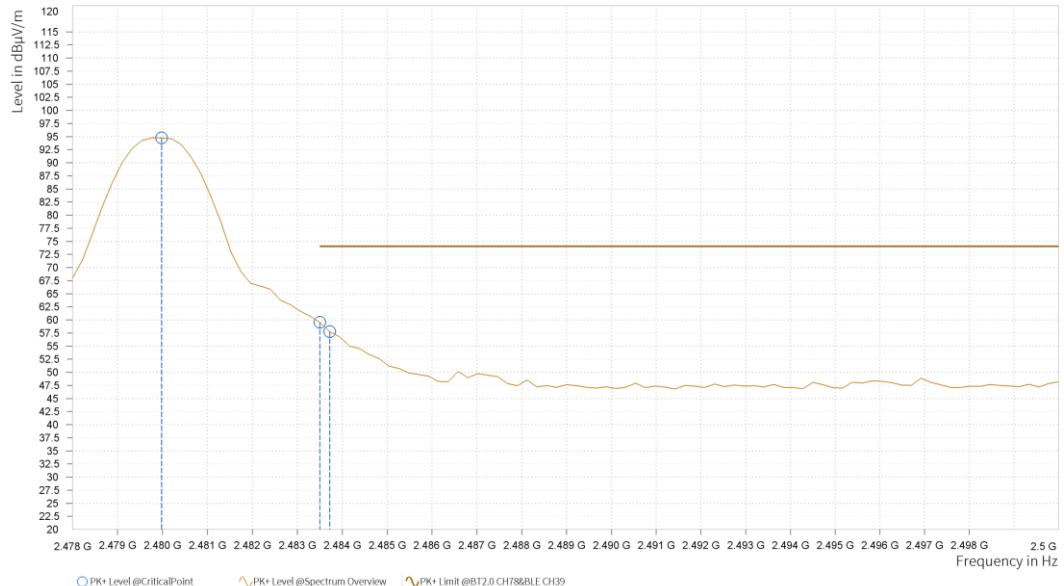
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CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

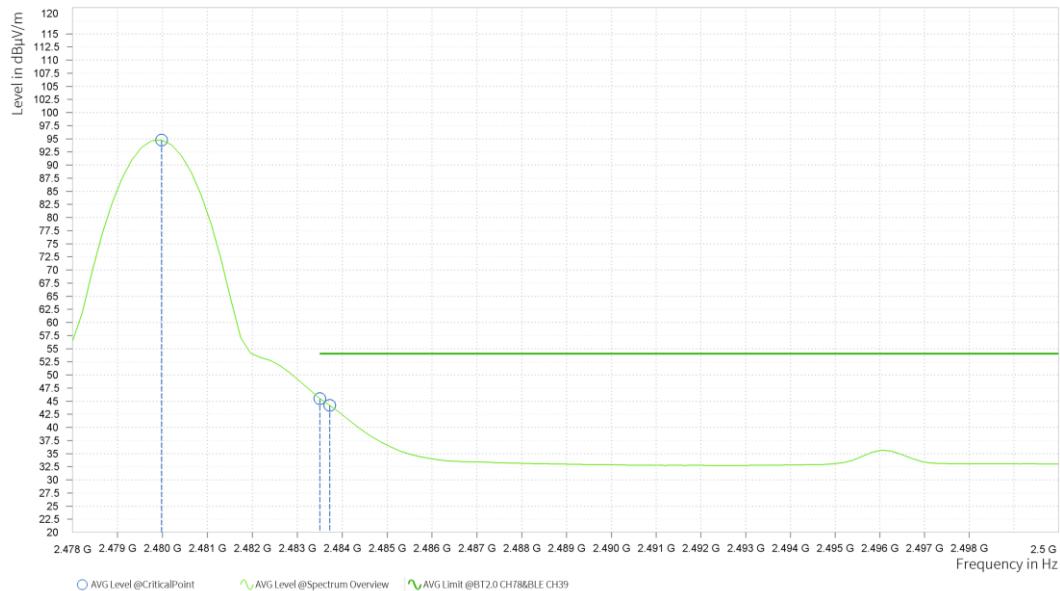
Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+ Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	94.75			9.07	H	58.2	2.0
6	2,483.500	59.54	74.0	14.46	9.11	H	58.2	2.0
6	2,483.720	57.76	74.0	16.24	9.12	H	58.2	2.0





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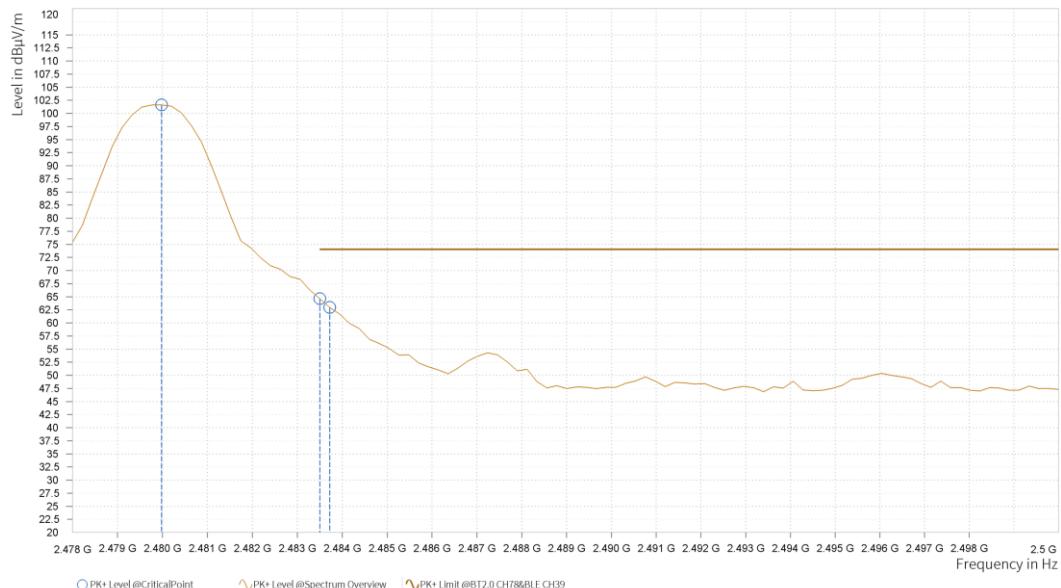
Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	94.76			9.07	H	52.1	2.0
6	2,483.500	45.5	54.0	8.5	9.11	H	52.1	2.0
6	2,483.720	44.19	54.0	9.81	9.12	H	52.1	2.0





ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB $\mu$ V/m]	PK+ Limit [dB $\mu$ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	101.6			9.07	V	47.3	1.0
6	2,483.500	64.62	74.0	9.38	9.11	V	359.0	1.0
6	2,483.720	62.94	74.0	11.06	9.12	V	359.1	1.0

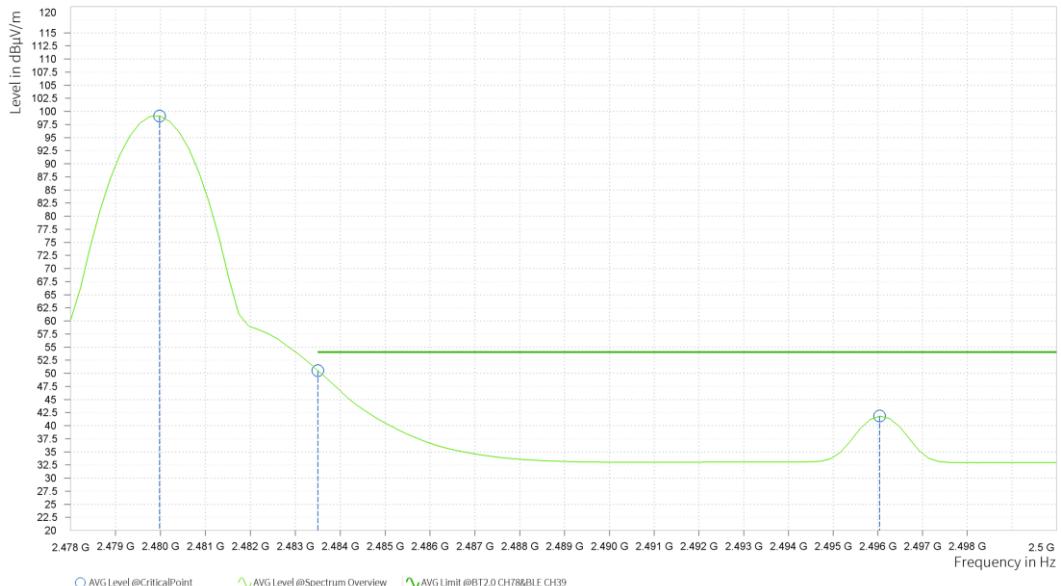




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Rg	Frequency [MHz]	AVG Level [dB $\mu$ V/m]	AVG Limit [dB $\mu$ V/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
6	2,479.980	99.13			9.07	V	46.2	1.0
6	2,483.500	50.52	54.0	3.48	9.11	V	46.2	1.0
6	2,496.040	41.83	54.0	12.17	9.26	V	350.6	1.0



## REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor  
Margin value = Limit value-Emission level.
2. 2480MHz: Fundamental frequency.



### 3.2 6 dB BANDWIDTH MEASUREMENT

#### 3.2.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum 6dB Bandwidth Measurement is 0.5 MHz.

#### 3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	R&S	ESW 44	101973	Mar.28,24	Mar.27,26
Open Switch and Control Unit	R&S	OSP-B157W8	100836	N/A	N/A
Vector Signal Generator	R&S	SMBV100B	102176	Mar.29,24	Mar.28,26
Signal Generator	R&S	SMB100A03	182185	Mar.29,24	Mar.28,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.19,24	Jun.18,26
Hygrothermograph	DELI	20210528	SZ015	Sep.05,24	Sep.04,26
PC	LENOVO	E14	HRSW0024	N/A	N/A
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.27,24	Apr.26,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.27,24	Apr.26,25
Test Software	EMC32	EMC32	N/A	N/A	N/A
Temperature Chamber	votsch	VT4002	58566078100050	May.30,24	May.29,26
Power Meter	R&S	NRX	102380	Mar.28,24	Mar.27,26
Power Meter probe	R&S	NRP6A	102942	Mar.28,24	Mar.27,26

#### NOTE:

1. The calibration interval of the above test instruments is 12/ 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.



### 3.2.3 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq$  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.

### 3.2.4 DEVIATION FROM TEST STANDARD

No deviation.

### 3.2.5 TEST SETUP



### 3.2.6 EUT OPERATING CONDITIONS

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



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### 3.2.7 TEST RESULTS

Please Refer to Appendix Of this test report.

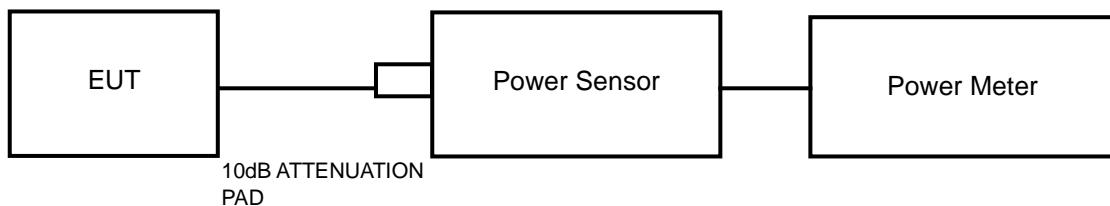


### 3.3 CONDUCTED OUTPUT POWER

#### 3.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

#### 3.3.2 TEST SETUP



#### 3.3.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

#### 3.3.4 TEST PROCEDURES

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

#### 3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 3.3.6 EUT OPERATING CONDITIONS

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



### 3.3.7 TEST RESULTS

#### 3.4.7.1 MAXIMUM PEAK OUTPUT POWER

Please Refer to Appendix Of this test report.



### 3.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE)

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

Please Refer to Appendix Of this test report.

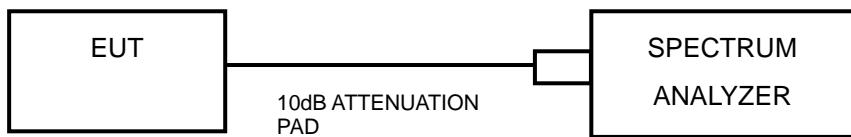


### 3.4 POWER SPECTRAL DENSITY MEASUREMENT

#### 3.4.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

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

#### 3.4.2 TEST SETUP



#### 3.4.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

#### 3.4.4 TEST PROCEDURE

1. Set the span to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW  $\geq$  3 x 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.

#### 3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 3.4.6 EUT OPERATING CONDITION

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



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### 3.4.7 TEST RESULTS

Please Refer to Appendix Of this test report.



### 3.5 OUT OF BAND EMISSION MEASUREMENT

#### 3.5.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

#### 3.5.2 TEST SETUP



#### 3.5.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

#### 3.5.4 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.

### **3.5.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **3.5.6 EUT OPERATING CONDITION**

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

### **3.5.7 TEST RESULTS**

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix Of this test report.



### **3.6 ANTENNA REQUIREMENTS**

#### **3.6.1 STANDARD APPLICABLE**

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **3.6.2 ANTENNA CONNECTED CONSTRUCTION**

An embedded-in antenna design is used.

#### **3.6.3 ANTENNA GAIN**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit and PSD limit



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## 4 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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## 5 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.



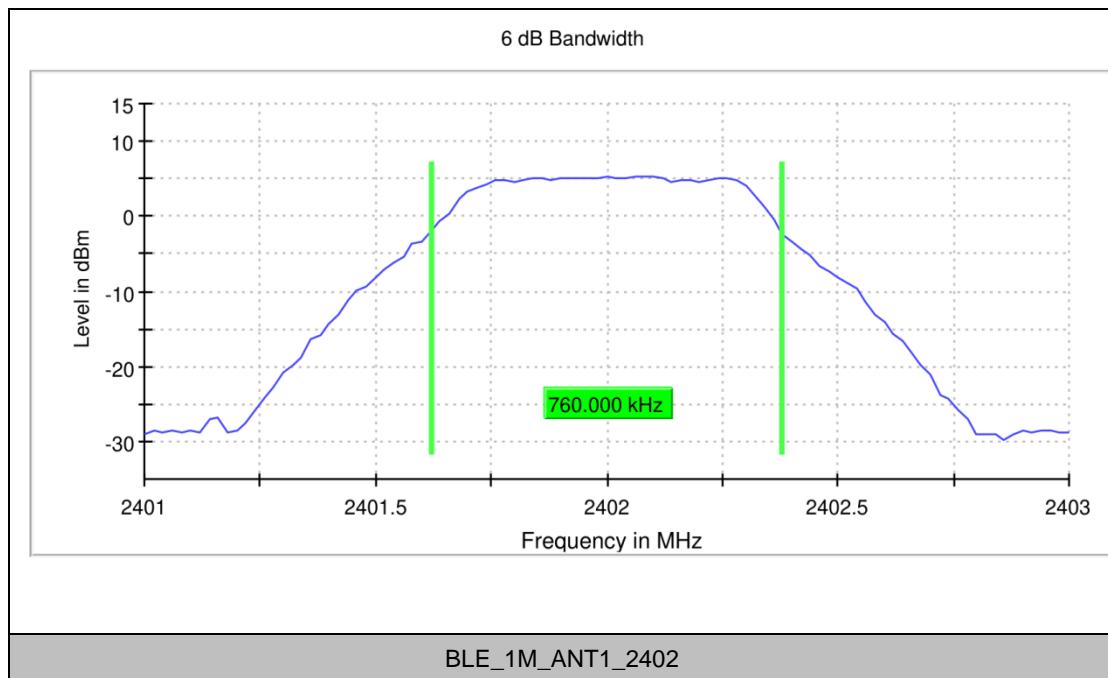
## 6 APPENDIX

### DTS BANDWIDTH

#### TEST RESULT

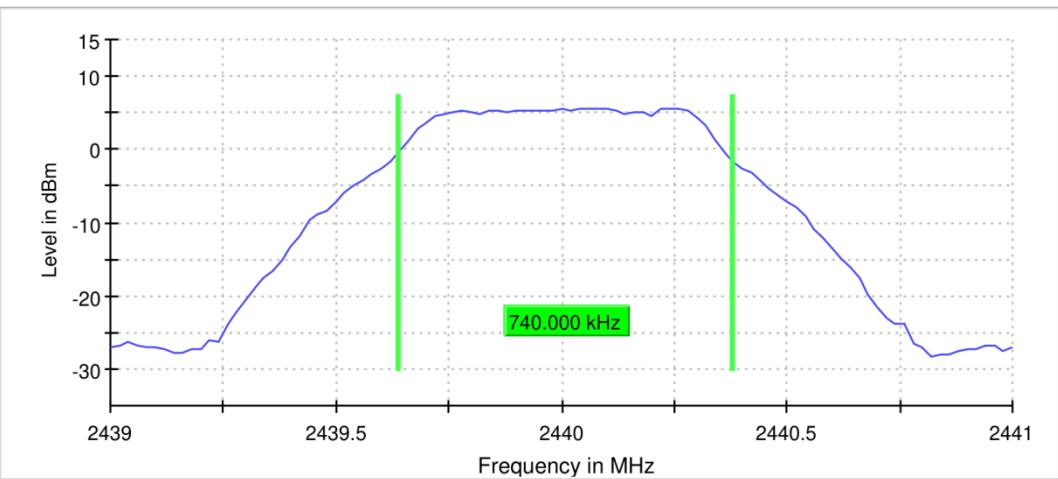
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	ANT1	2402	0.760	2401.620	2402.380	0.5	PASS
		2440	0.740	2439.640	2440.380	0.5	PASS
		2480	0.760	2479.620	2480.380	0.5	PASS

#### TEST GRAPHS



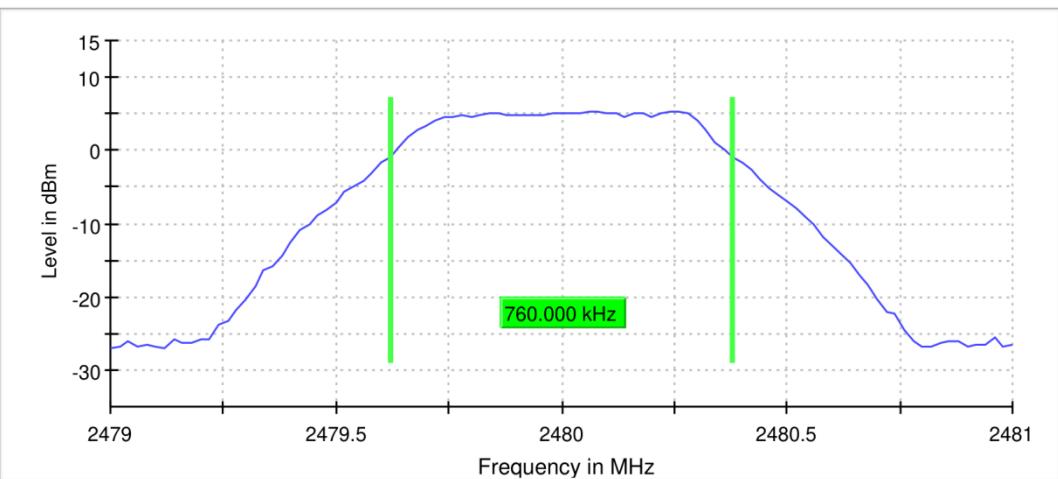


6 dB Bandwidth



#### BLE\_1M\_ANT1\_2440

6 dB Bandwidth



#### BLE\_1M\_ANT1\_2480

RBW 100.000 kHz

VBW 300.000 kHz

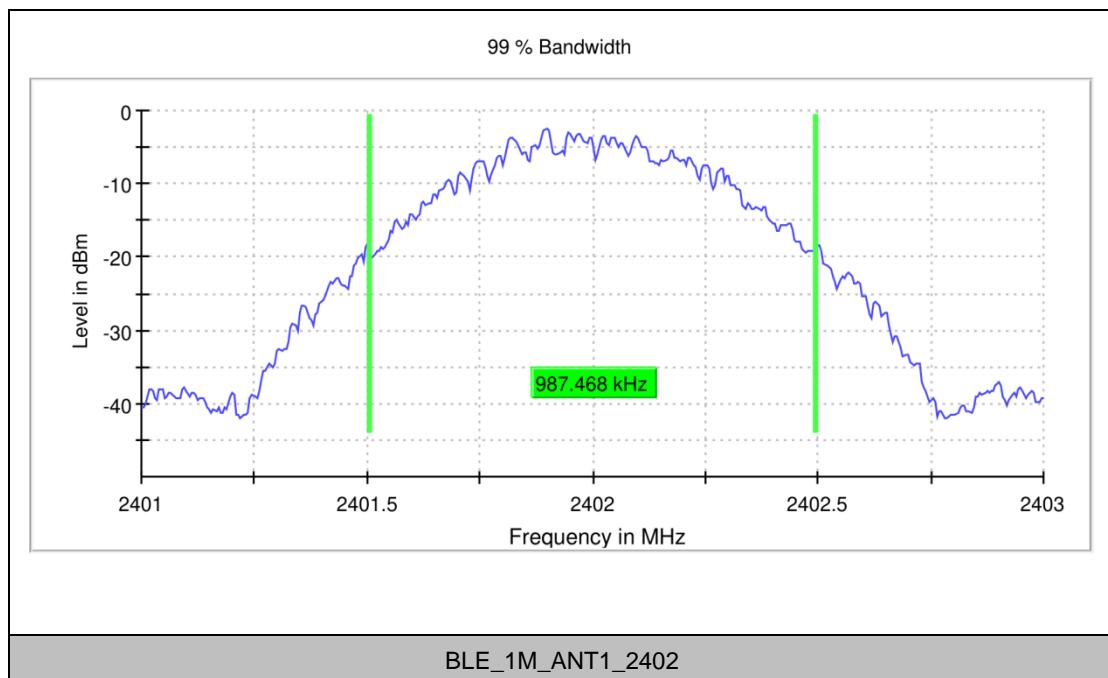


## OCCUPIED CHANNEL BANDWIDTH

### TEST RESULT

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	ANT1	2402	0.987	2401.506	2402.494	2400-2483.5	PASS
		2440	1.003	2439.501	2440.504	2400-2483.5	PASS
		2480	1.023	2479.491	2480.514	2400-2483.5	PASS

### TEST GRAPHS

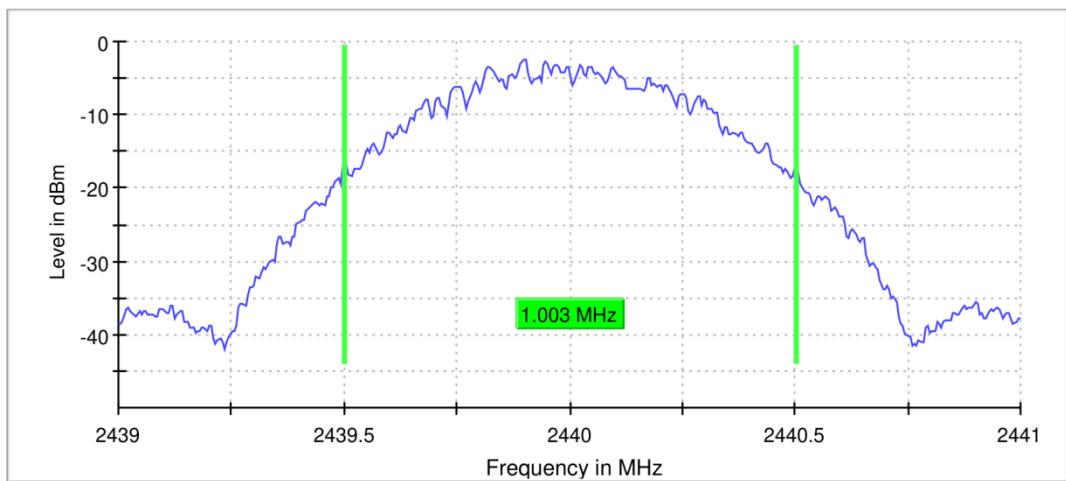




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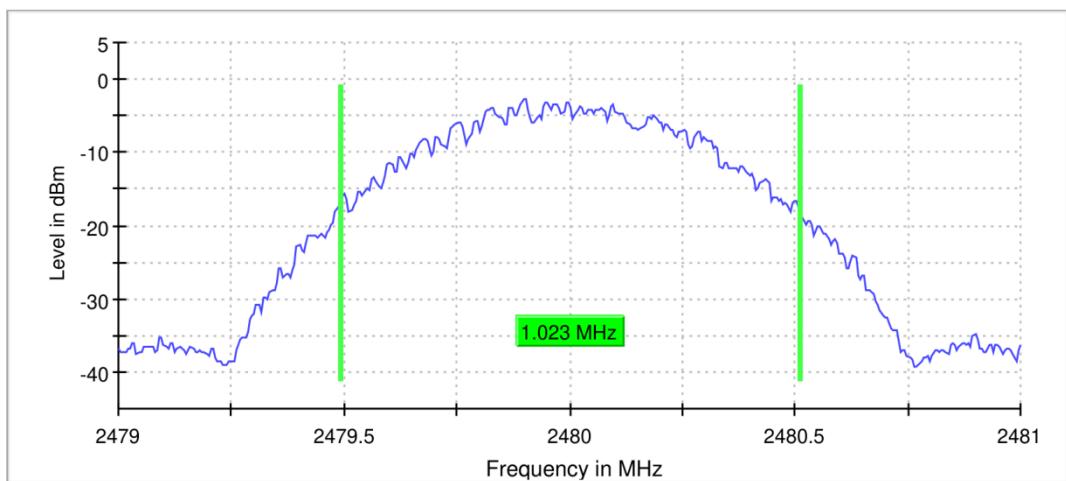
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99 % Bandwidth



BLE\_1M\_ANT1\_2440

99 % Bandwidth



BLE\_1M\_ANT1\_2480

RBW 30.000 kHz

VBW 100.000 kHz



## MAXIMUM CONDUCTED OUTPUT POWER

### TEST RESULT

TestMode	Antenna	Channel	Average power [dBm]	Peak power [dBm]	Peak power [mw]	Limit [dBm]	Verdict	Power Setting
BLE_1M	Ant1	2402	6.99	7.61	5.76	≤30	PASS	05
		2440	7.18	7.81	6.04	≤30	PASS	05
		2480	7.04	7.62	5.78	≤30	PASS	05

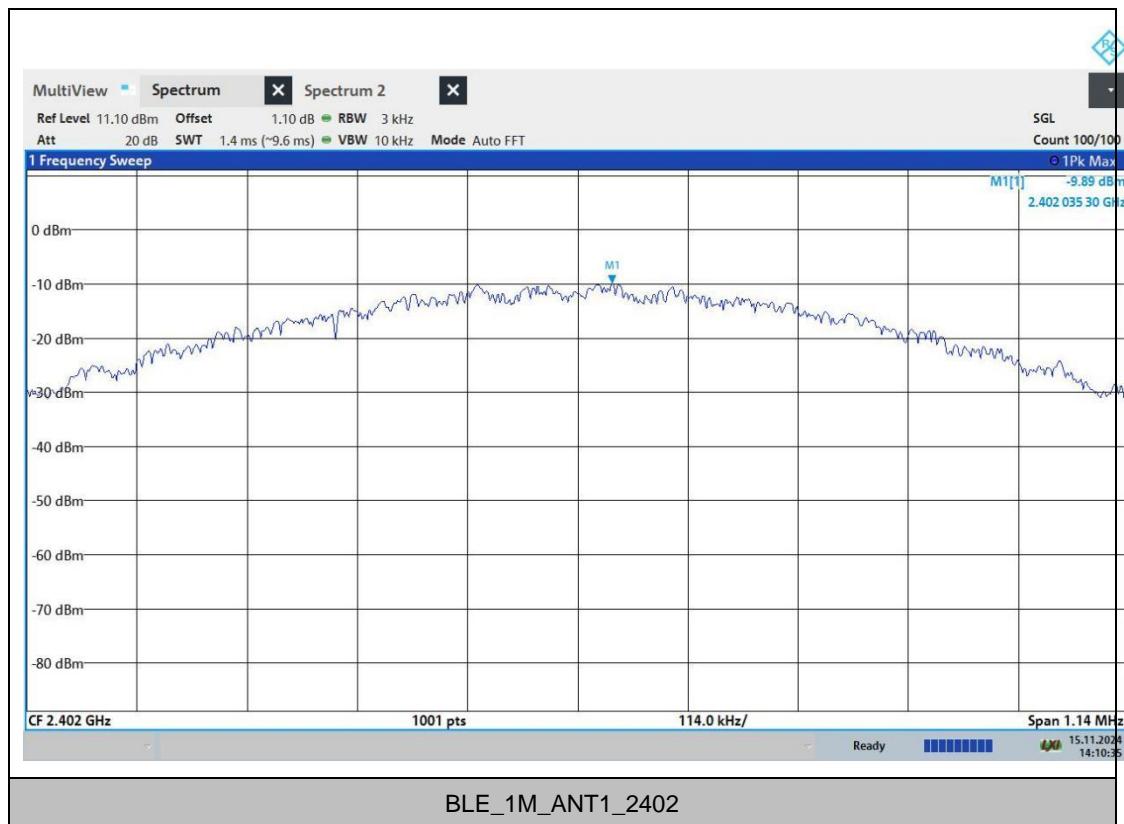


## MAXIMUM POWER SPECTRAL DENSITY

### TEST RESULT

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	ANT1	2402	-9.89	≤8	PASS
		2440	-9.09	≤8	PASS
		2480	-8.33	≤8	PASS

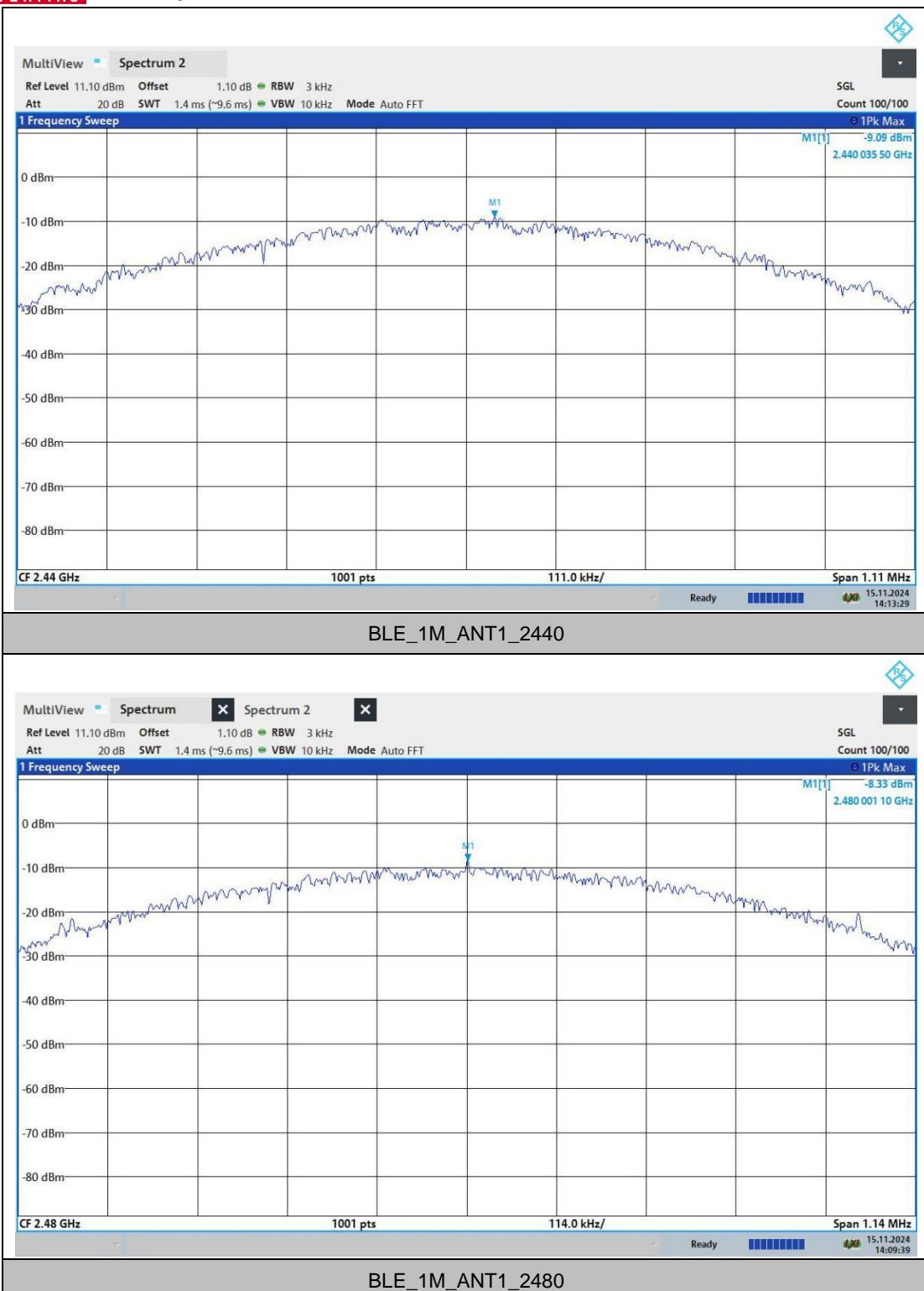
### TEST GRAPHS





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Test Report No.: W7L-241104W001RF01



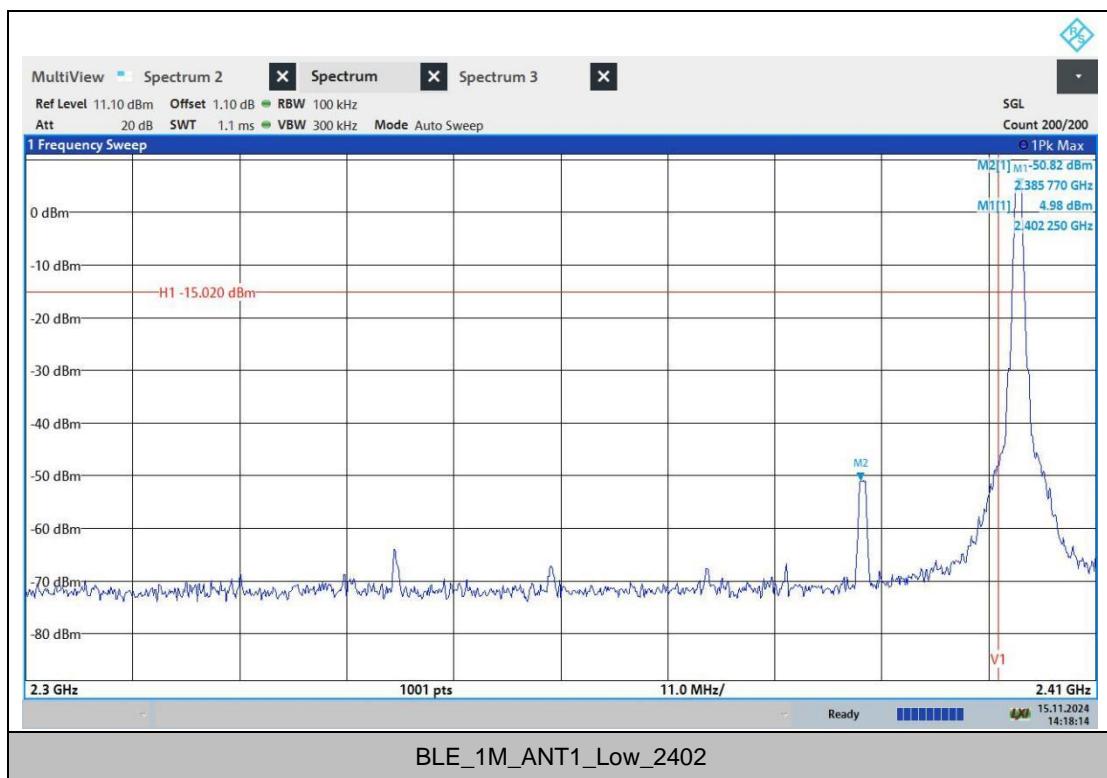


## BAND EDGE MEASUREMENTS

### TEST RESULT

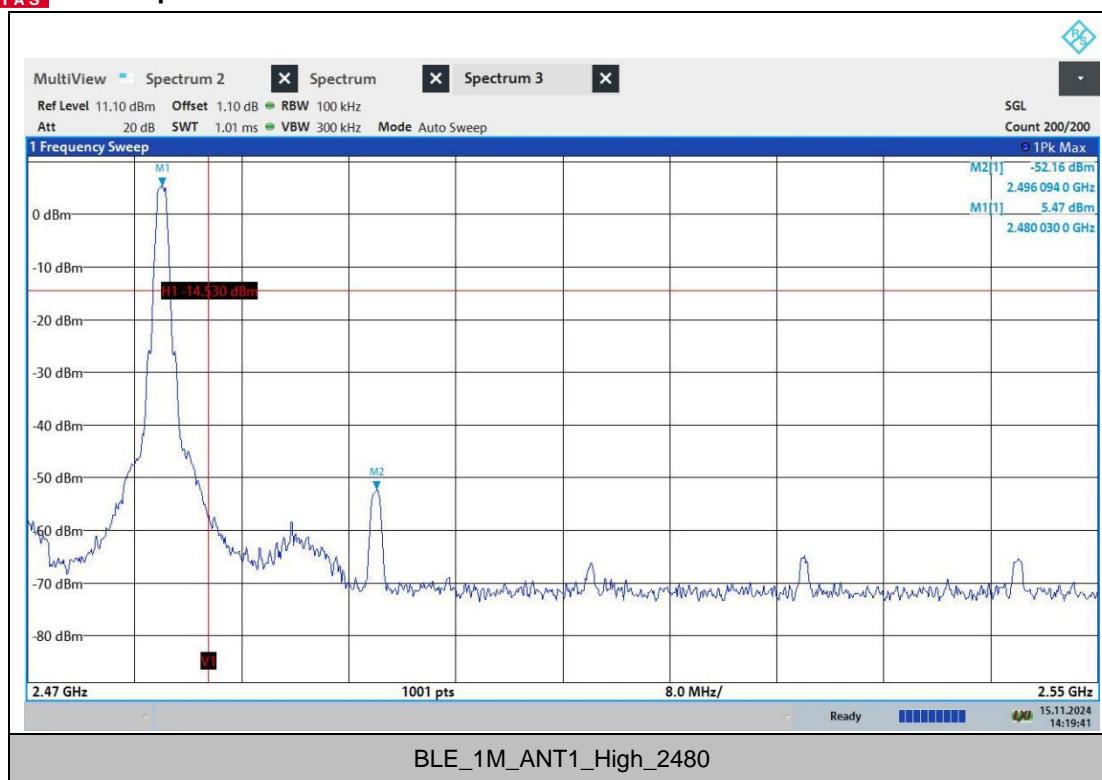
TestMode	Antenna	ChName	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	ANT1	Low	2402	See test graph	See test graph	PASS
		High	2480	See test graph	See test graph	PASS

### TEST GRAPHS





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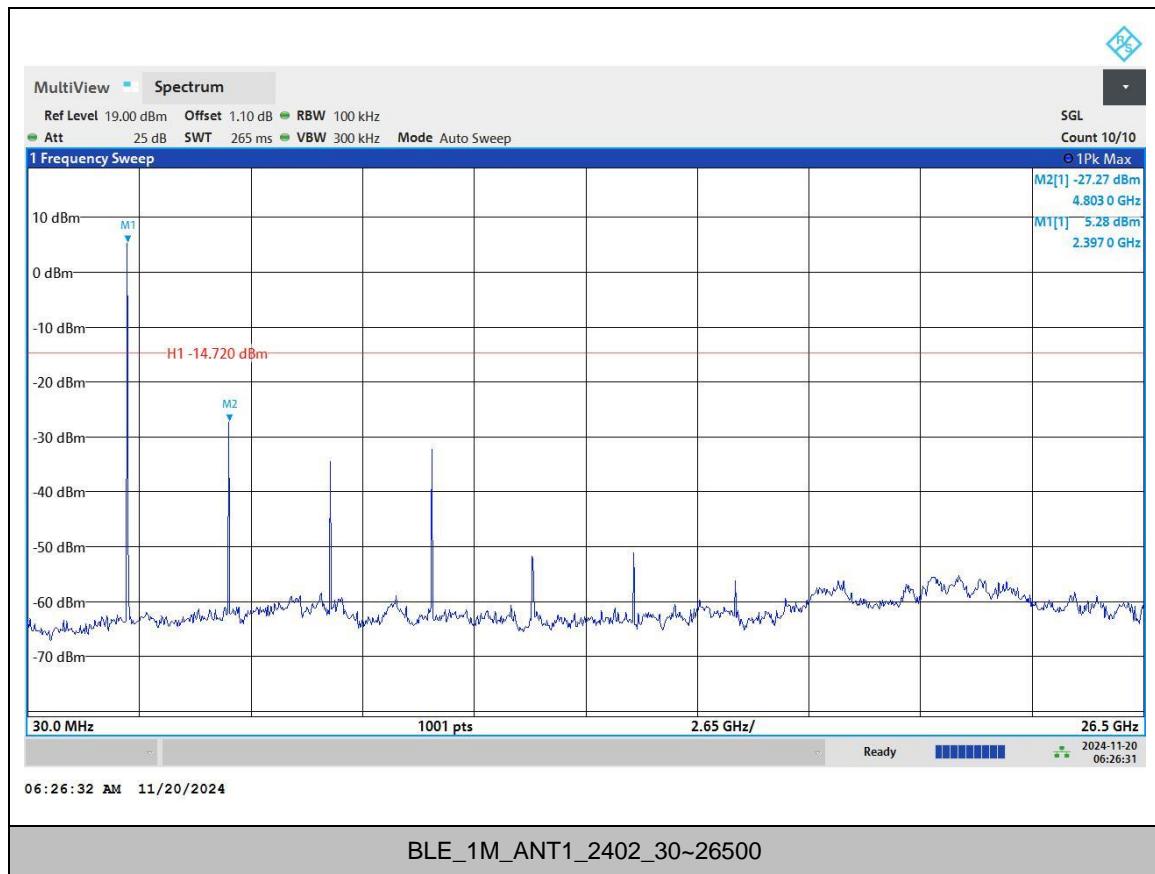


## CONDUCTED SPURIOUS EMISSION

### TEST RESULT

TestMode	Antenna	Channel	FreqRange [MHz]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	ANT1	2402	30~26500	See test graph	See test graph	PASS
		2440	30~26500	See test graph	See test graph	PASS
		2480	30~26500	See test graph	See test graph	PASS

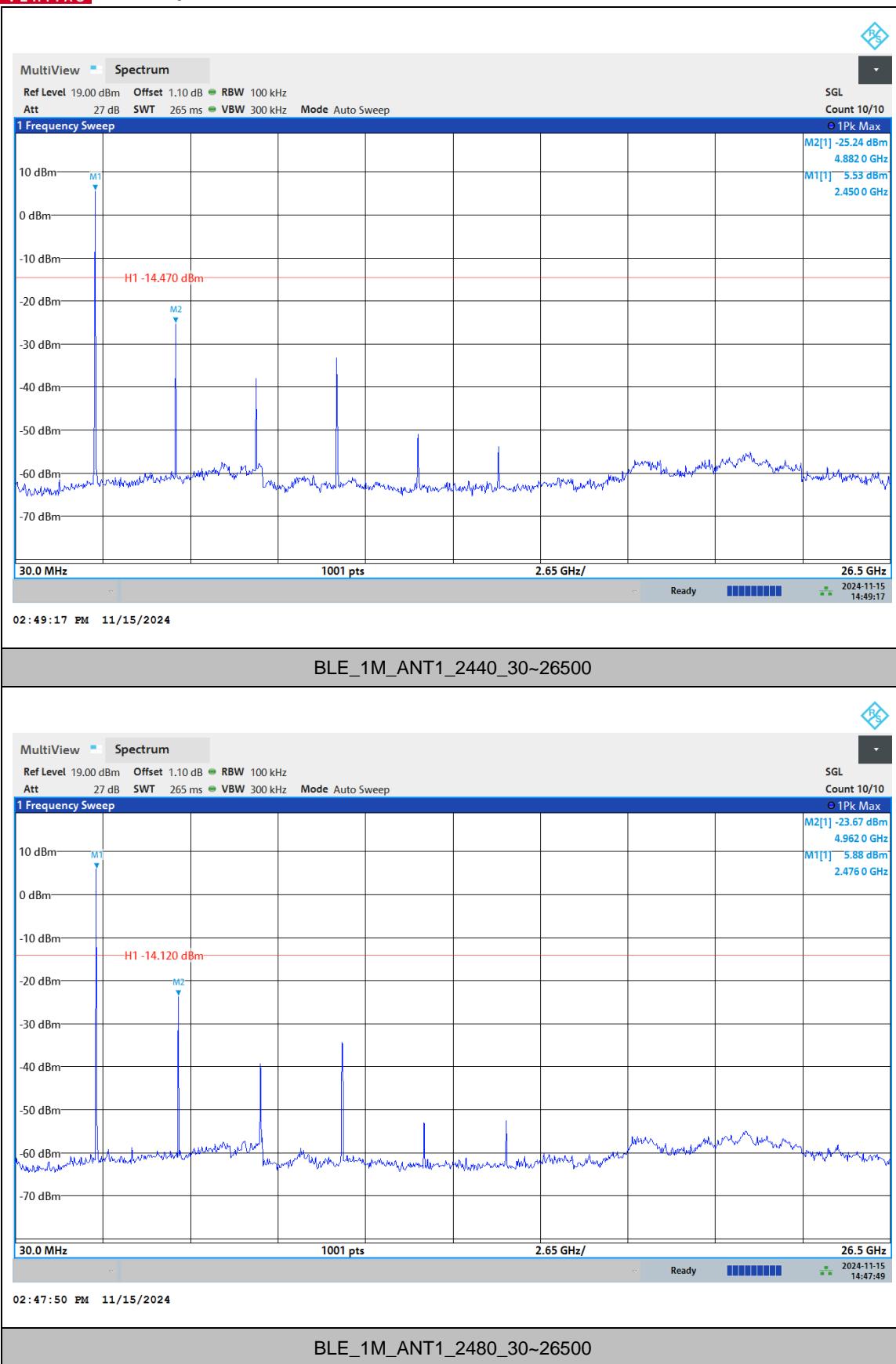
### TEST GRAPHS





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VERITAS

Test Report No.: W7L-241104W001RF01



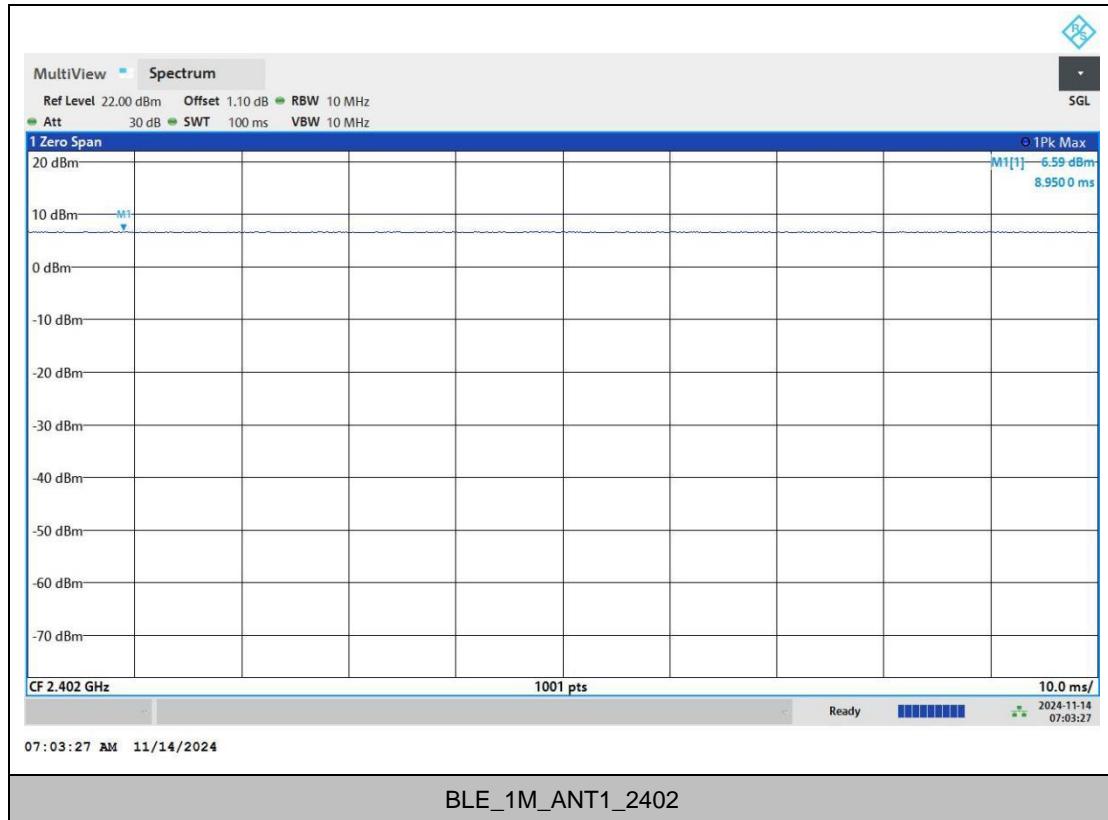


## DUTY CYCLE

## TEST RESULT

TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	DC [%]	xFactor	Limit	Verdict
BLE_1M	ANT1	2402	100	100	100	0	---	PASS

## TEST GRAPHS



--END--