

TEST REPORT

Applicant/Manufacturer: Rip Curl Pty Ltd.
Address : 101 Surf Coast Hwy Torquay Vic Australia
Report Number : SZ1230726-43450E-RF-07

Test Standard (s)

Item 19 of Article 2 Paragraph 1

Sample Description

Product Type: Rip Curl Search GPS 3
Model No.: 010MTI
Multiple Model(s) No.: N/A
Trade Mark: RIP CURL
Date Received: 2023/07/26
Report Date: 2023/08/07

Test Result:

Pass*

* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

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Approved By:

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Note: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk "*". Customer model name, addresses, names, trademarks etc. are not considered data.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZ1230726-43450E-RF-07	Original Report	2023-08-07

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Radio Type		BLE
Technical Parameters	Modulation Type	GFSK
	Data Rate	1Mbps & 2Mbps
	Frequency Range	2402-2480MHz
	Rated Output Power	BLE 1M: 0.7mW, BLE 2M: 0.6mW
	Antenna Gain*	0dBi (It is provided by the manufacturer)
Nominal Power Supply		DC 3.7V from battery
Test Sample serial number		28xx-4 (Assigned by BACL, Shenzhen)
Sample/EUT Status		Good condition

Objective

The objective of the manufacturer is to demonstrate compliance with Radio Law of Japan item 19 of Article 2 Paragraph 1, rules and limits for this device including:

- Frequency Error
- Occupied Bandwidth
- Transmitter Spurious Emission and Unwanted Emission Intensity
- Antenna Output Power And Output Power Tolerance
- Receiver Spurious Emission Strength
- Interference Prevention Function
- Construction Protection Confirmation

Measurement Uncertainty

Item	Expanded Measurement uncertainty
Frequency error	213.55Hz
Occupied Channel Bandwidth	±5%
RF output power, conducted	0.74dB(k=2, 95% level of confidence)
Unwanted Emission, conducted	1.75dB(k=2, 95% level of confidence)
Temperature	±1℃
Supply voltages	±0.4%
Humidity	±1%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

Each test item follows test standards and with no deviation.

EUT TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a testing mode by some software.

40 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	21	2444
...
...
...
18	2438	38	2478
19	2440	39	2480

EUT was tested with channel 0, 19 and 39.

The EUT has a power manage chip: XC6504A3319R-G, the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/- 1%. Exempt extremely high and low supply voltage condition tests, EUT only operated in normal voltage to test all regulations.

EUT Exercise Software

EUT was test in engineering mode and the power level set is Default*. The power level was provided by applicant.

Equipment Modifications

No modification was made to the EUT tested.

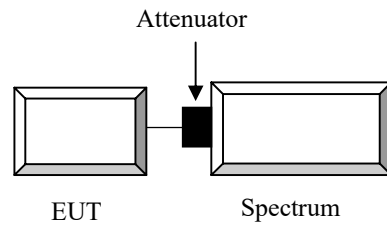
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From/Port	To
/	/	/	/

Configuration of Test Setup



SUMMARY OF TEST RESULTS

MIC Notice No.88 Appendix No.43 Article 2, Paragraph 1, Item 19 Rules Section	Description of Test	Result
3	Frequency Error	Compliant
4	Occupied Bandwidth	Compliant
5	Transmitter Spurious Emission and Unwanted Emission Intensity	Compliant
6	Antenna Output Power and Output Power Tolerance	Compliant
7	Receiver Spurious Emission and Unwanted Emission Intensity	Compliant
8	Transmission Antenna Gain	Not Applicable
10	Carrier sense capability	Not Applicable**
9	Transmission Radiation Angle Width	Not Applicable
11	Frequency Hopping Dwell Time	Not Applicable*
12	Interference Prevention Function	Compliant
Note 1	Construction Protection Confirmation	Compliant

Not Applicable* -Testing is only required for FHSS system devices.

Not Applicable**-The OBW of EUT is less than 26 MHz.

Not Applicable - This test item was not required for the output power less than 12.14 dBm (E.I.R.P)

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date	Calibration Authority	Calibration Method
Tonscend	RF control Unit	JS0806-2	19D8060154	2022/9/15	2023/9/14	CCIC	c)
R&S	spectrum analyzer	FSV40	101942	2023/02/08	2024/02/07	BACL	c)
WEINSCHEL	10dB Attenuator	5324	F-03-EM122	2022/11/25	2023/11/24	BACL	c)
R&S	Wideband Radio Communication Tester	CMW500	141718	2022/10/12	2023/10/11	CCIC	c)
Unknown	RF Cable	Unknown	Unknown	Each time	/	BACL	d)

Note: Calibration Method

a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1)

b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) ~Japan Calibration Service System~

c) Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1)

d) Calibration conducted by using other equipment that listed above from a) to c)

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FREQUENCY ERROR

Limit

50 ppm or below

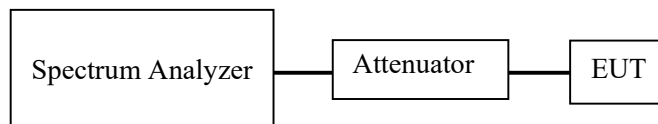
Test Procedure

Set the EUT to the measurement frequency without modulation.
Setting of SA is following as:

- Center Frequency: Frequency to measure
- RBW: 10 kHz, VBW: 10 kHz
- Span: 1MHz
- Sweep time: Auto or more
- Log scale: 10dB/Div, Data points: 400 points or more
- Reference level: Enough level for maximum dynamic range
- Detection: Positive Peak
- Sweep mode: Single Sweep
- Marker: Spot

Record the peak spot frequency.

If the EUT can't set at un-modulation mode, measure the 10dBc center frequency.



Test Data

Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	47.4 %
ATM Pressure:	101.0 kPa

The testing was performed by Bruce Lin on 2023-08-01.

Test Result: Compliant

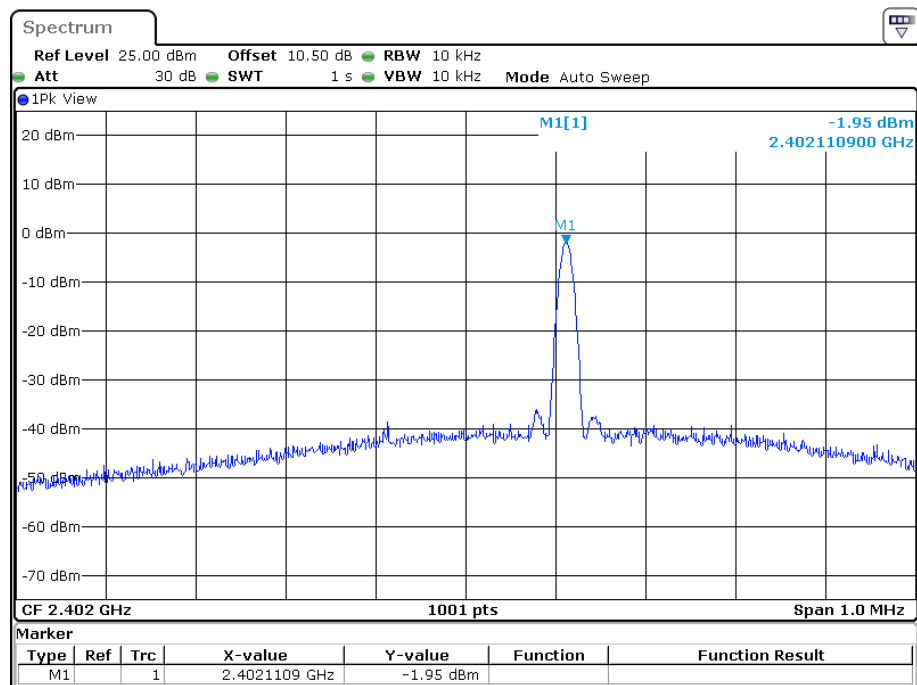
Test Mode: Transmitting (un-modulation)

Normal Voltage

Frequency (MHz)	Measure frequency (MHz)	Frequency tolerance (ppm)	Limit (ppm)
2402	2402.110900	46.17	< 50
2440	2440.112900	46.27	
2480	2480.114900	46.33	

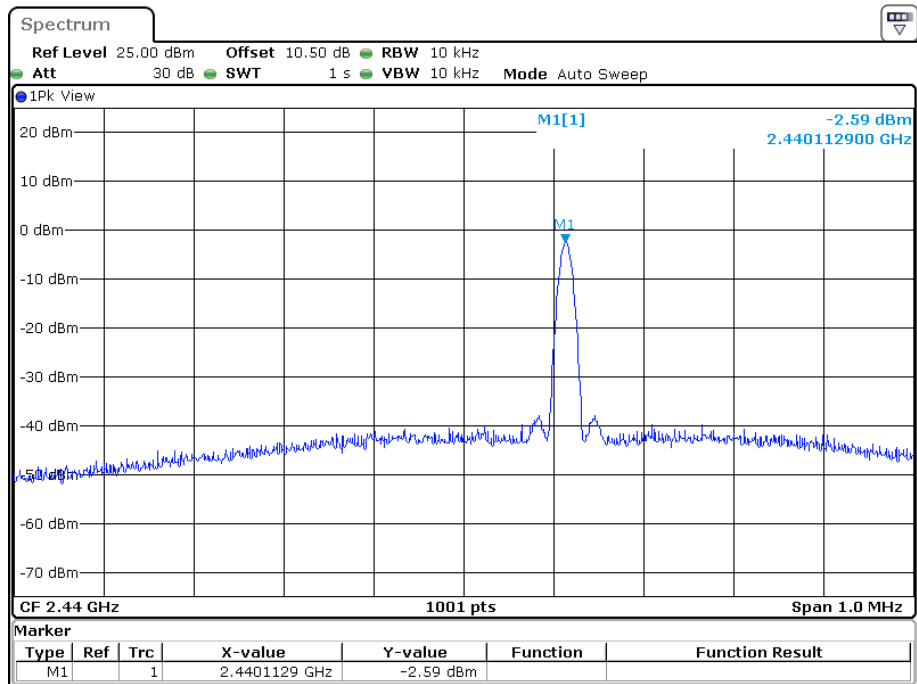
Note: Frequency tolerance = (Measure Frequency-Center Frequency)*10⁶/Center Frequency

Low Channel



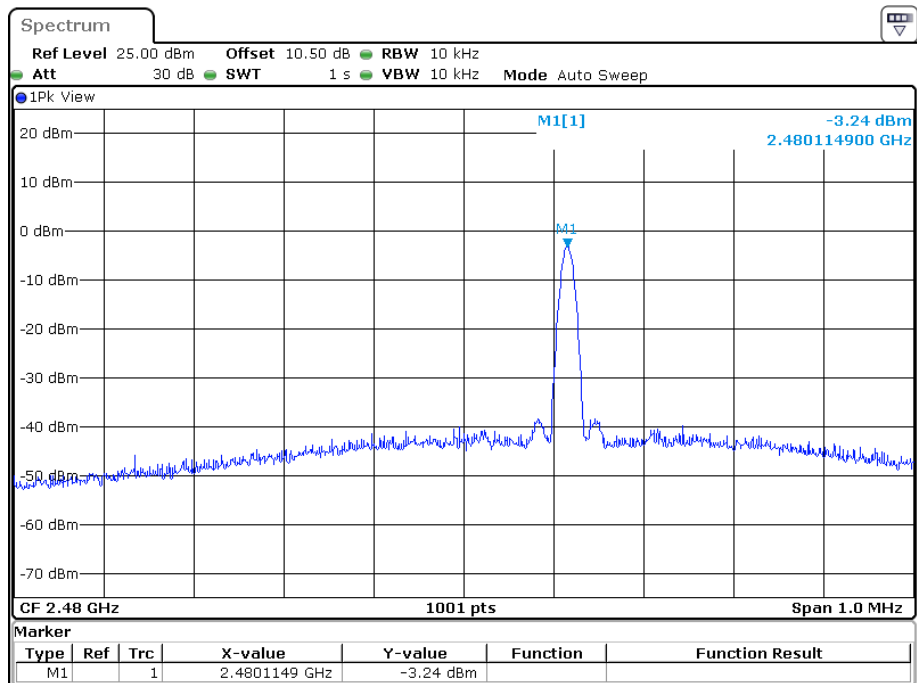
Date: 1.AUG.2023 20:51:30

Middle Channel



Date: 1.AUG.2023 20:52:18

High Channel



Date: 1.AUG.2023 20:52:53

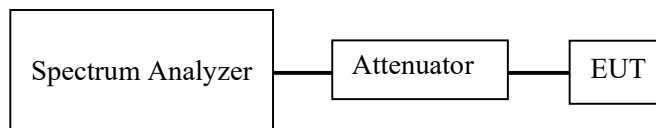
OCCUPIED BANDWIDTH

Limit

- Occupied bandwidth: FH \leq 83.5 MHz; OFDM, DS \leq 26 MHz; Others \leq 26 MHz

Test Procedure

- Setting of SA is following as:
 - Center Frequency: Frequency to measure
 - RBW: 30 kHz, VBW: 30 kHz
 - Span: 3MHz/6MHz
 - Sweep time: Auto or more
 - Log scale: 10dB/Div, Data points: 400 points or more
 - Reference level: Enough level for maximum dynamic range
 - Detection: Positive Peak
 - Sweep mode: Continuous Sweep
 - Marker: Spot
- EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 99% of occupied bandwidth to measure occupied bandwidth.



Test Data

Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	47.4 %
ATM Pressure:	101.0 kPa

The testing was performed by Bruce Lin on 2023-08-01.

Test Result: Compliant

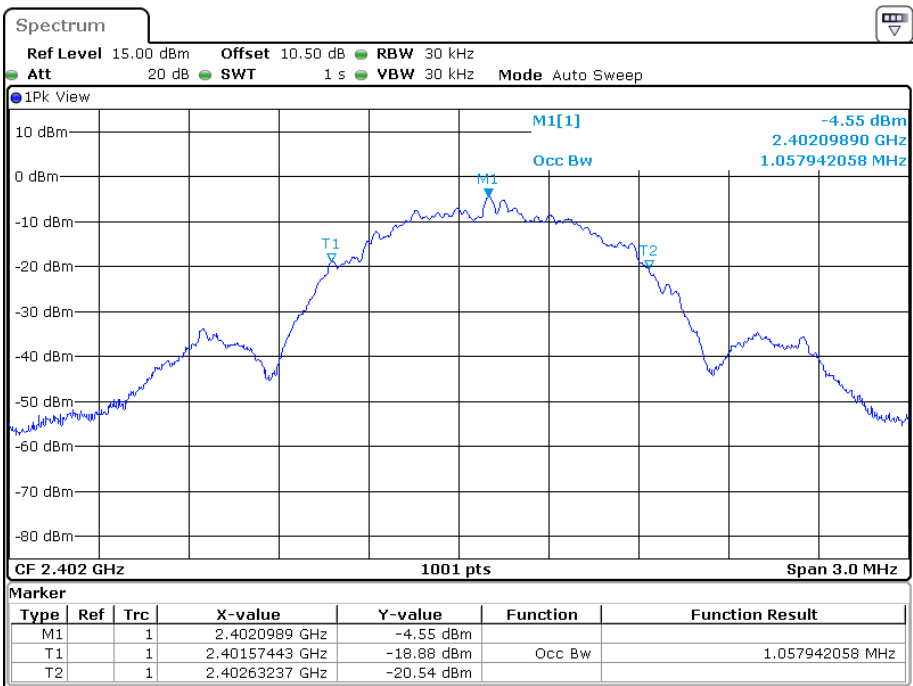
Test Mode: Transmitting

Occupied Bandwidth

Mode	Voltage	2402 MHz	2440 MHz	2480MHz	Limit
BLE 1M	Normal Voltage	1.058	1.070	1.058	≤26MHz
BLE 2M	Normal Voltage	2.068	2.056	2.068	≤26MHz

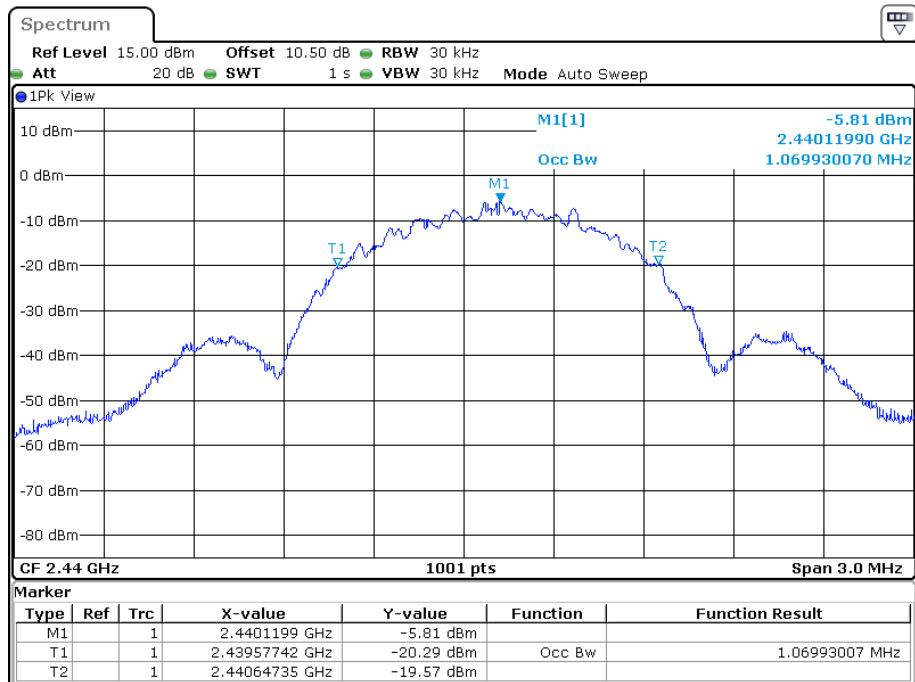
BLE_1M

Low Channel



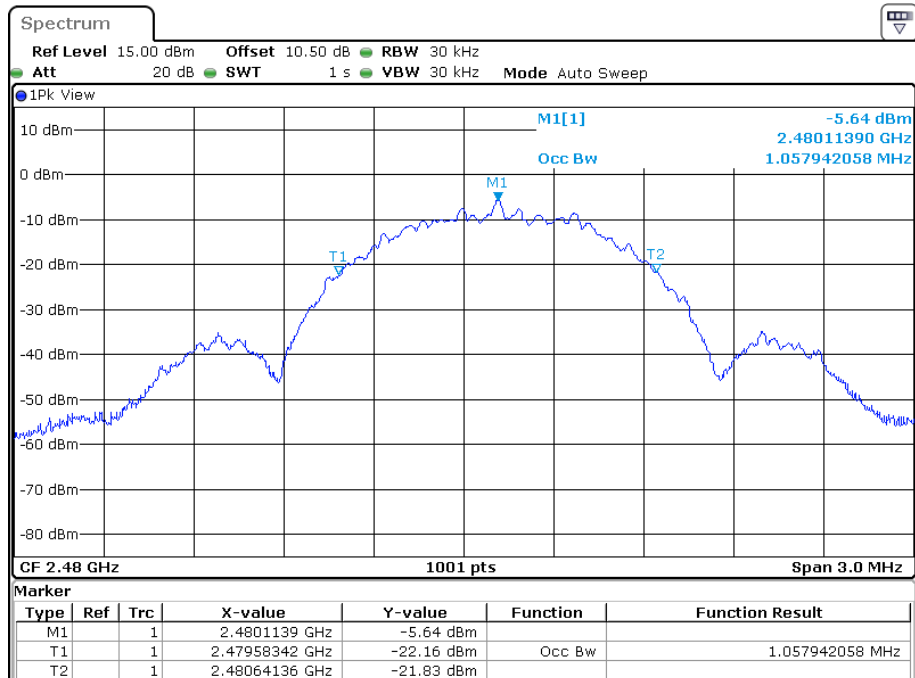
Date: 1.AUG.2023 20:25:09

Middle Channel



Date: 1.AUG.2023 20:28:47

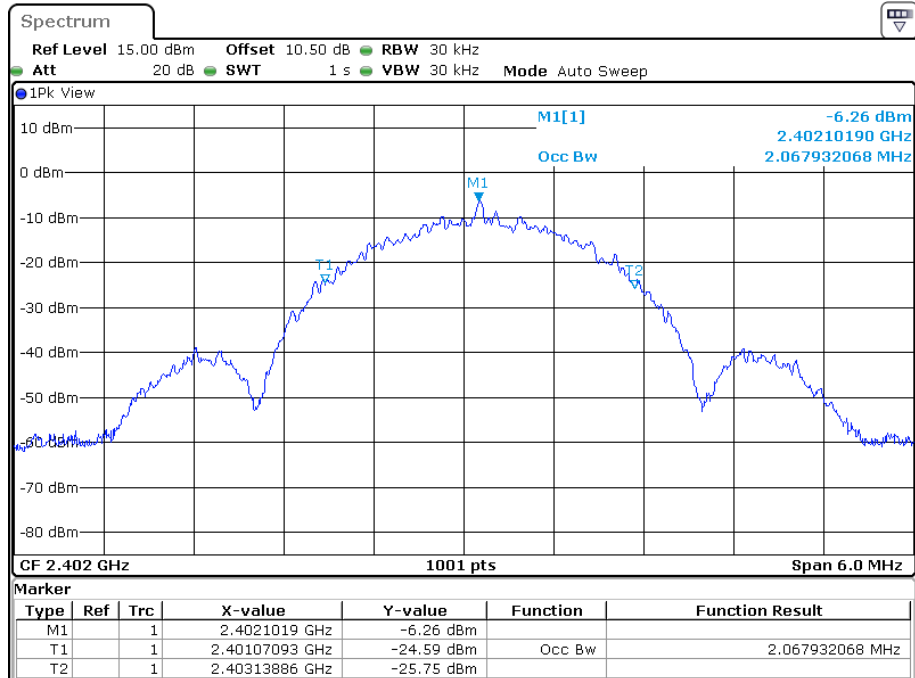
High Channel



Date: 1.AUG.2023 20:31:47

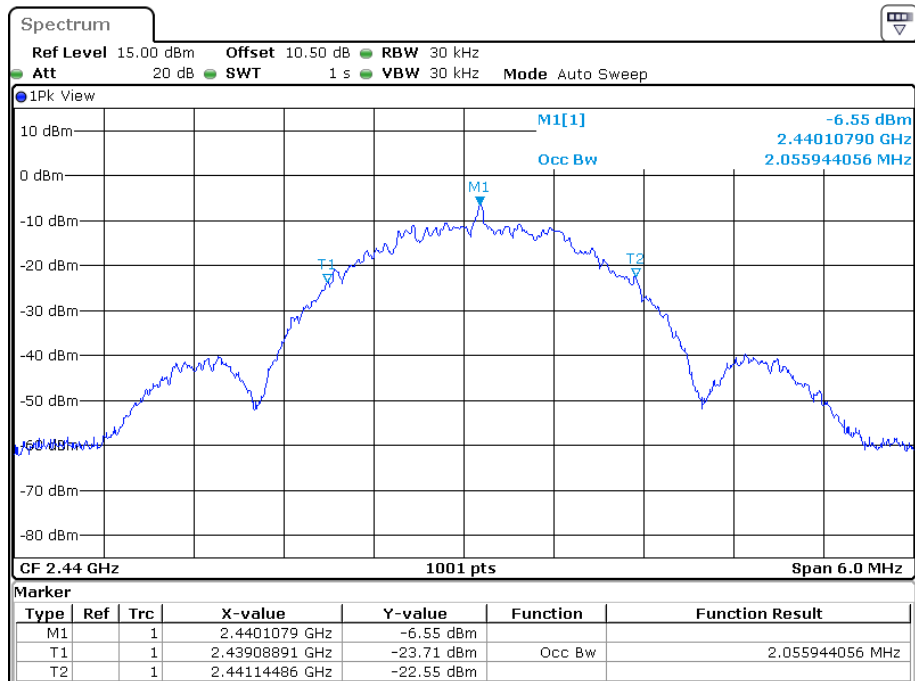
BLE_2M

Low Channel



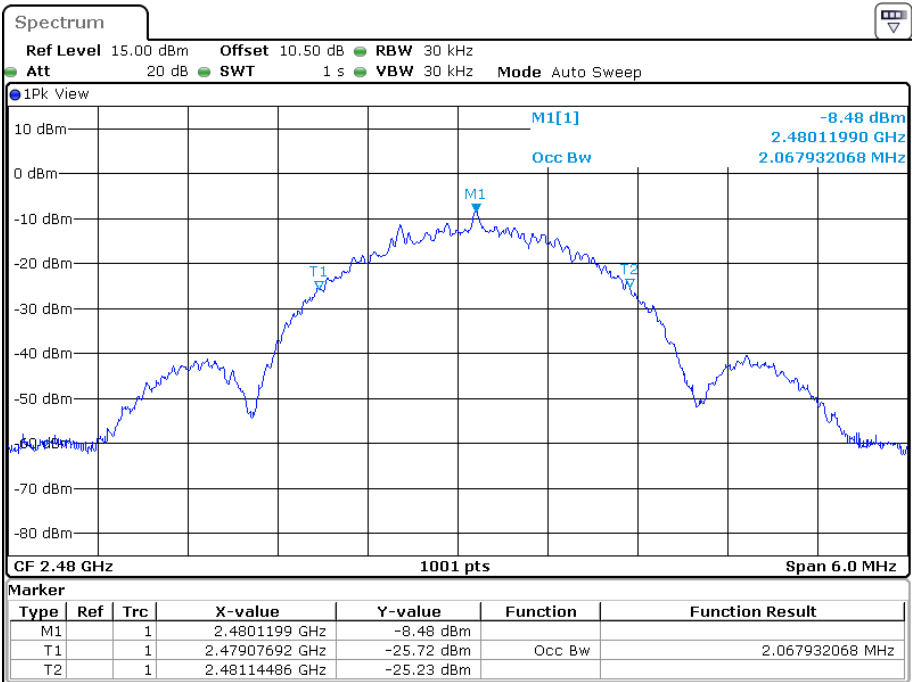
Date: 1.AUG.2023 20:39:43

Middle Channel



Date: 1.AUG.2023 20:43:00

High Channel



Date: 1.AUG.2023 20:46:10

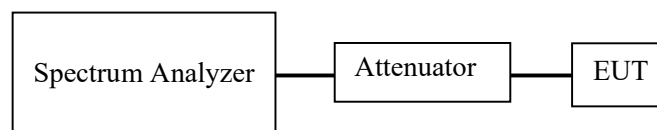
TRANSMITTER SPURIOUS EMISSION STRENGTH AND UNWANTED EMISSION INTENSITY

Limit

- $f < 2387 \text{ MHz}$, $f > 2496.5 \text{ MHz}$: $\leq 2.5 \mu\text{W/MHz}$
- $2387 \text{ MHz} \leq f \leq 2400 \text{ MHz}$; $2483.5 \text{ MHz} < f \leq 2496.5 \text{ MHz}$: $\leq 25 \mu\text{W/MHz}$

Test Procedure

Measurement System Diagram



Conditions of Application Equipment (EUT)

- The modulation state shall be in continuously transmitting mode.

Spectrum Analyzer Conditions

- Span: Measuring Frequency Range
- RBW: 1MHz (frequency range; 1GHz over), 100kHz (frequency range; 30MHz to 1GHz)
- VBW: Same as RBW (1MHz or 100kHz)
- Sweep time: Auto (Minimum time to ensure measurement accuracy.)
- Data points : 400 points or more
- Reference level: Enough level for maximum dynamic range
- Detection: Positive Peak

If the measured value is under the technical standard value, do not need to measure more detail.

Test Data

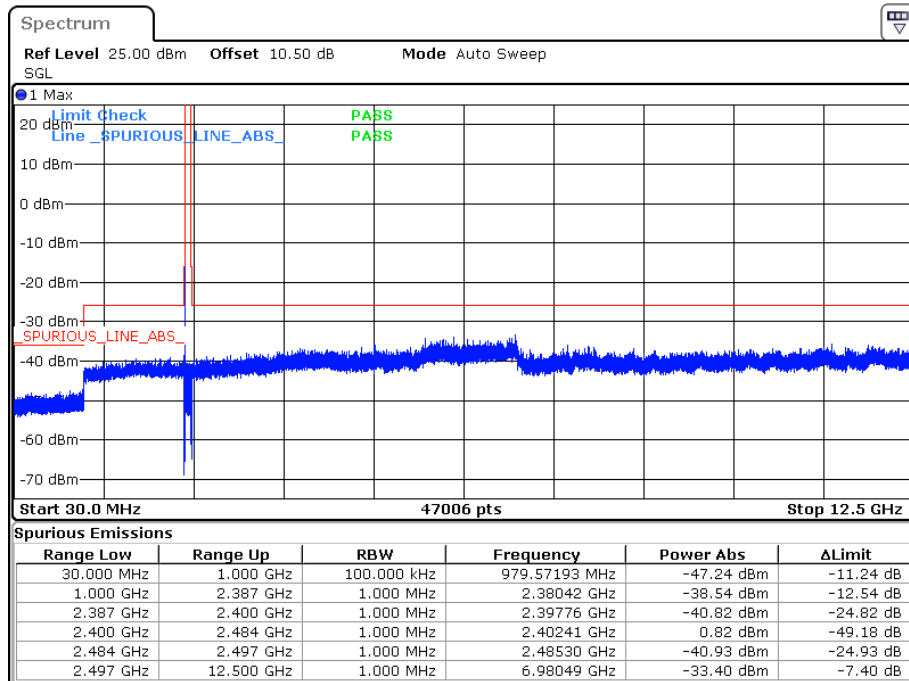
Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	47.4 %
ATM Pressure:	101.0 kPa

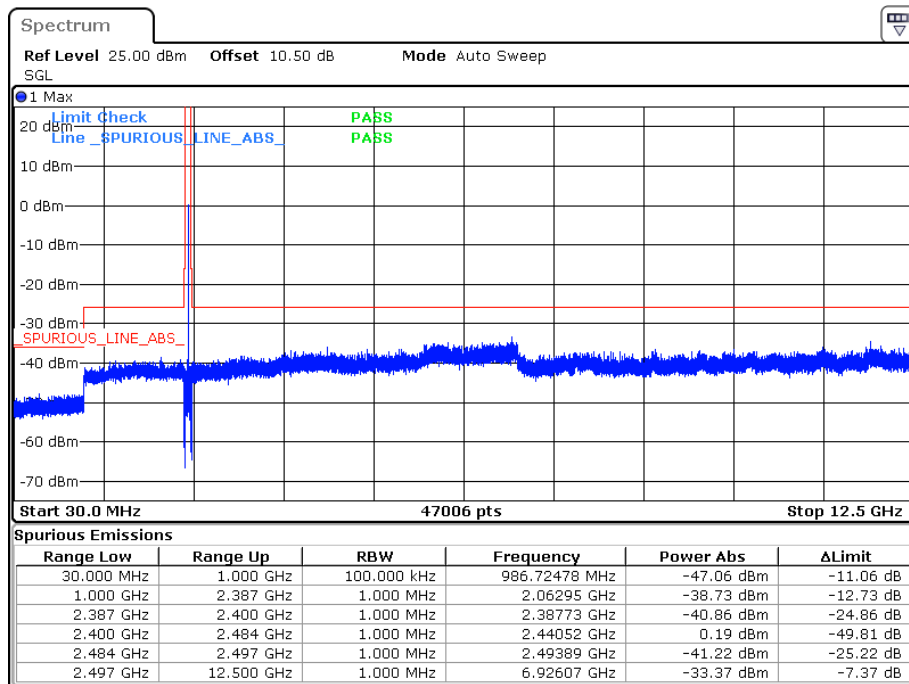
The testing was performed by Bruce Lin on 2023-08-01.

Test Result: Compliant

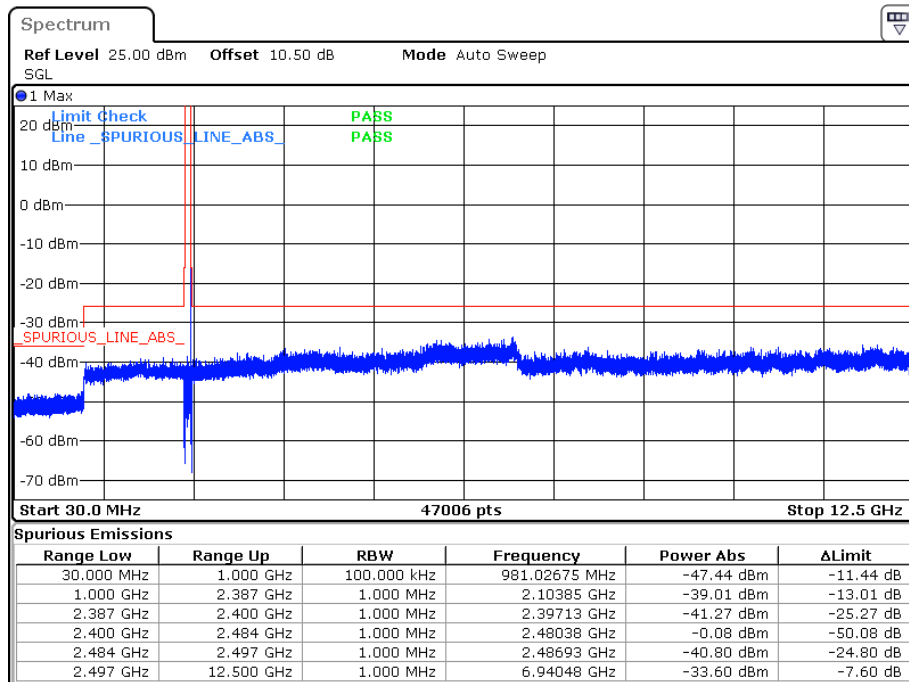
Please refer to the below plots

BLE_1M
Low Channel:**30MHz-12.5GHz**

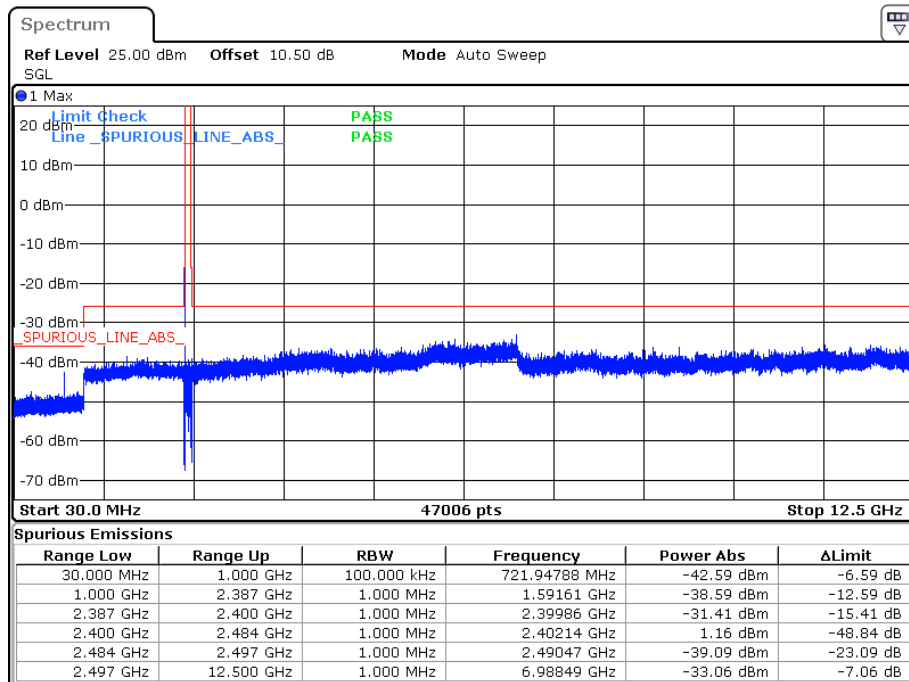
Date: 1.AUG.2023 20:27:10

Middle Channel:**30MHz-12.5GHz**

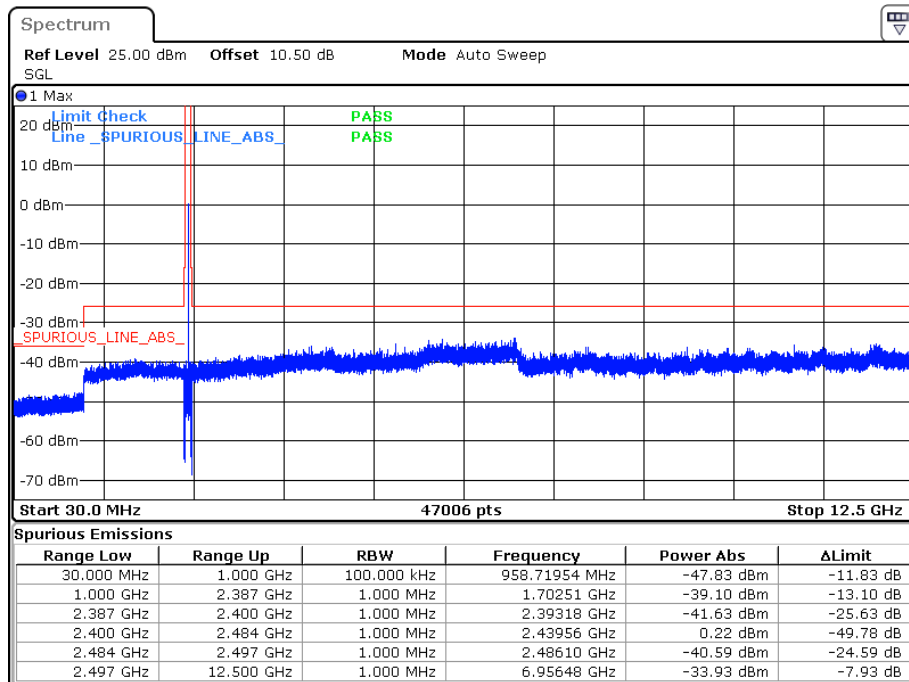
Date: 1.AUG.2023 20:30:28

High Channel:**30MHz-12.5GHz**

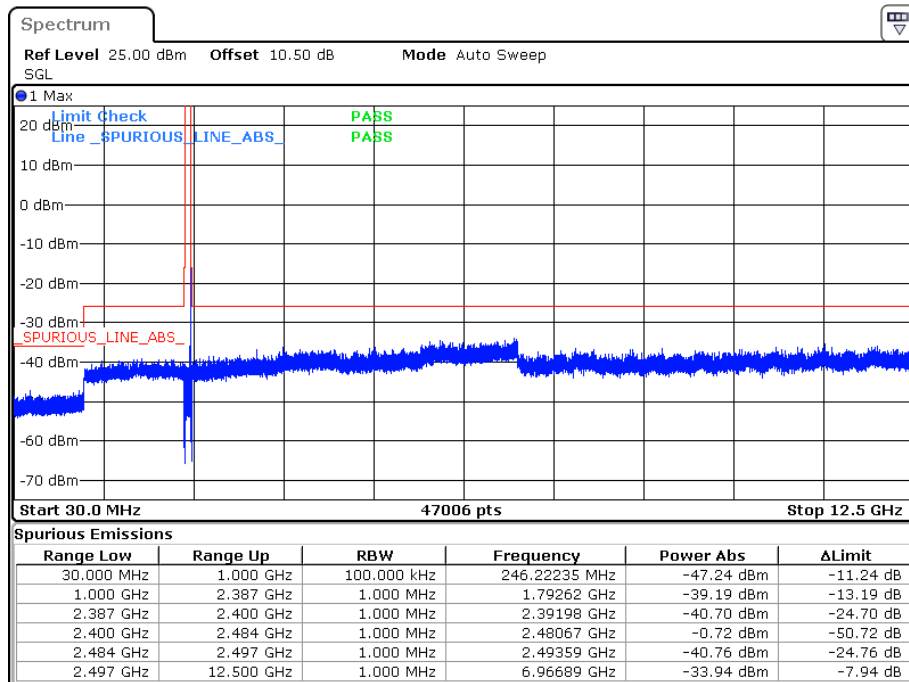
Date: 1.AUG.2023 20:33:48

BLE 2M**Low Channel:****30MHz-12.5GHz**

Date: 1.AUG.2023 20:41:12

Middle Channel:**30MHz-12.5GHz**

Date: 1.AUG.2023 20:44:48

High Channel:**30MHz-12.5GHz**

Date: 1.AUG.2023 20:47:48

ANTENNA OUTPUT POWER AND ANTENNA POWER TOLERANCE

Limit

- $\leq 3 \text{ mW /MHz}$ (FHSS from 2402-2480 MHz)
- $\leq 10 \text{ mW/MHz}$ (OFDM, DSSS from 2400-2483.5 MHz)
- $\leq 10 \text{ mW}$ (other from 2400-2483.5 MHz)

The Output Power Tolerance must be within +20%, -80%.

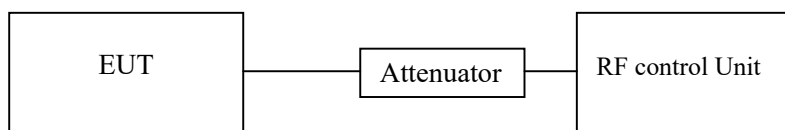
Test Procedure

Step 1: Measure the total power by Power Meter in a state of hopping mode or non-hopping mode (with Average Sensor)

Step 2: If it's the burst wave, set the power meter to measure averaging across the burst transmit on period.

Step 3: Record the reading on power meter as antenna output power.

Test Setup Block diagram



Note: the power meter was integrated in the RF control Unit.

Test Data

Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	47.4 %
ATM Pressure:	101.0 kPa

The testing was performed by Bruce Lin on 2023-08-01.

Test Result: Compliant

Test Mode: Transmitting

BLE 1M:
Normal voltage

Frequency	Low channel	Middle channel	High channel	Limit
Antenna Output Power (dBm)	-2.08	-2.75	-3.51	10
Antenna Output Power (mW)	0.62	0.53	0.45	10
Antenna Output Power Tolerance (%)	-11.43	-24.29	-35.71	-80 ~ +20
EIRP(dBm)	-2.08	-2.75	-3.51	12.14

Note 1: The nominal Output power is 0.7mW, which was declared by manufacturer.
Antenna gain is 0dBi.

BLE 2M:
Normal voltage

Frequency	Low channel	Middle channel	High channel	Limit
Antenna Output Power (dBm)	-3.51	-2.54	-3.22	10
Antenna Output Power (mW)	0.45	0.56	0.48	10
Antenna Output Power Tolerance (%)	-25.00	-6.67	-20.00	-80 ~ +20
EIRP(dBm)	-3.51	-2.54	-3.22	12.14

Note 1: The nominal Output power is 0.6mW, which was declared by manufacturer.
Antenna gain is 0dBi.

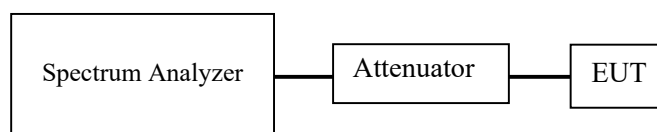
RECEIVER SPURIOUS EMISSION AND UNWANTED EMISSION INTENSITY

Limit

- $\leq 4 \text{ nW}$ ($30 \text{ MHz} \leq f \leq 1000 \text{ MHz}$)
- $\leq 20 \text{ nW}$ ($f \geq 1 \text{ GHz}$)

Test Procedure

Measurement System Diagram



Conditions of Application Equipment (EUT)

- The modulation state shall be “continuous receiving mode”.

Spectrum Analyzer Conditions

- Start Frequency: Start Frequency of frequency range to measure (30MHz or 1GHz)
- Stop Frequency: Stop Frequency of frequency range to measure (1GHz or 12.5GHz)
- Span: AUTO (Measurement Range)
- RBW: 100 kHz, VBW: 100 kHz for Frequency < 1 GHz
- RBW: 1MHz, VBW: 1MHz for Frequency > 1 GHz
- Sweep time: AUTO or more
- Sweep mode: Auto Sweep
- Detection: Positive Peak
- Reference Level: Enough level for maximum dynamic range

If the measured value is under the technical standard value, do not need to measure more detail.

Test Data**Environmental Conditions**

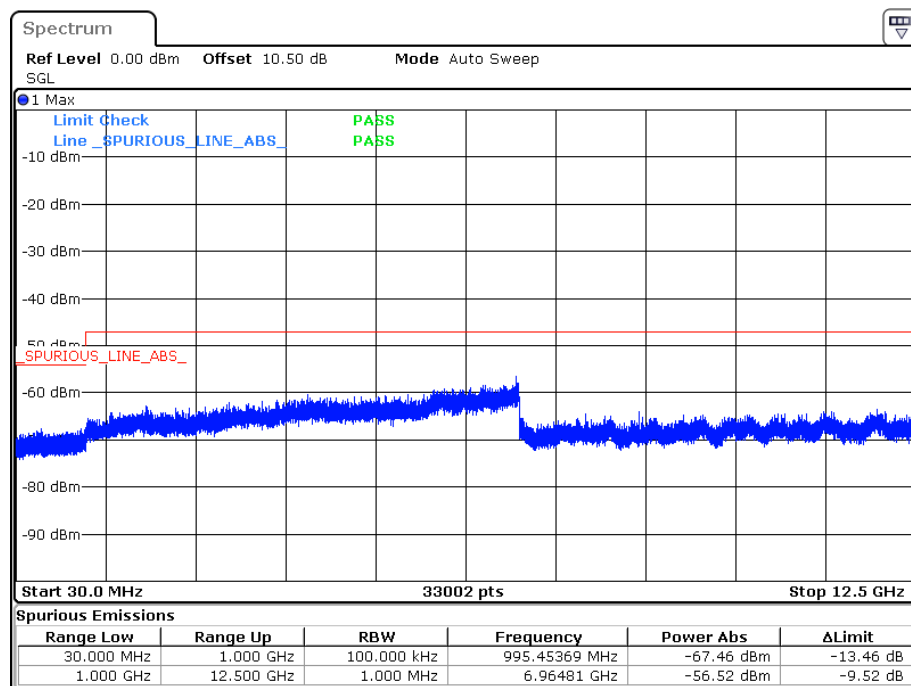
Temperature:	26.8 °C
Relative Humidity:	46.4 %
ATM Pressure:	101.0 kPa

The testing was performed by Bruce Lin on 2023-08-02.

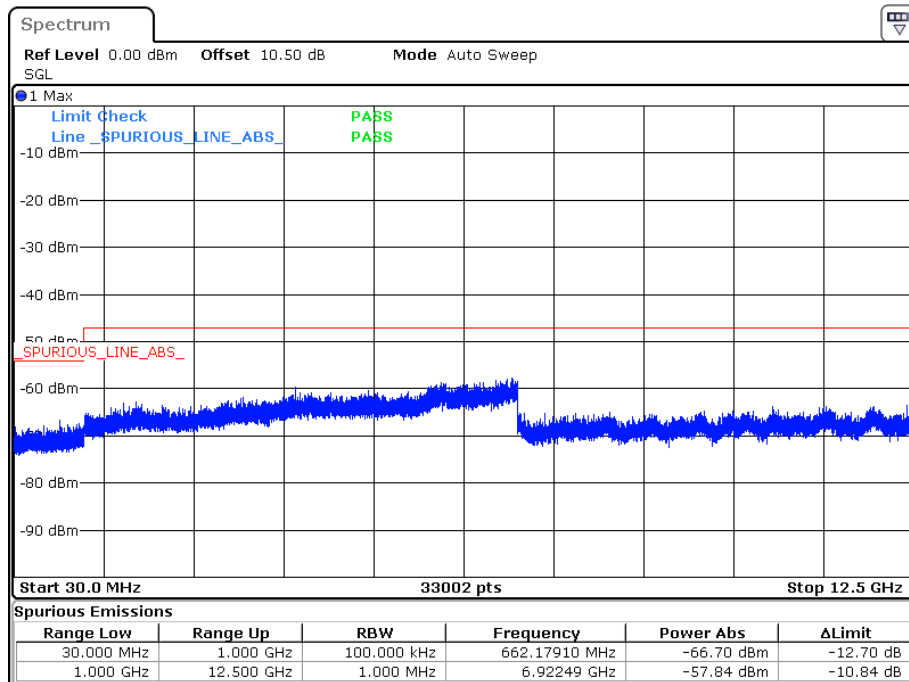
Test Result: Compliant

Test Mode: Receiving

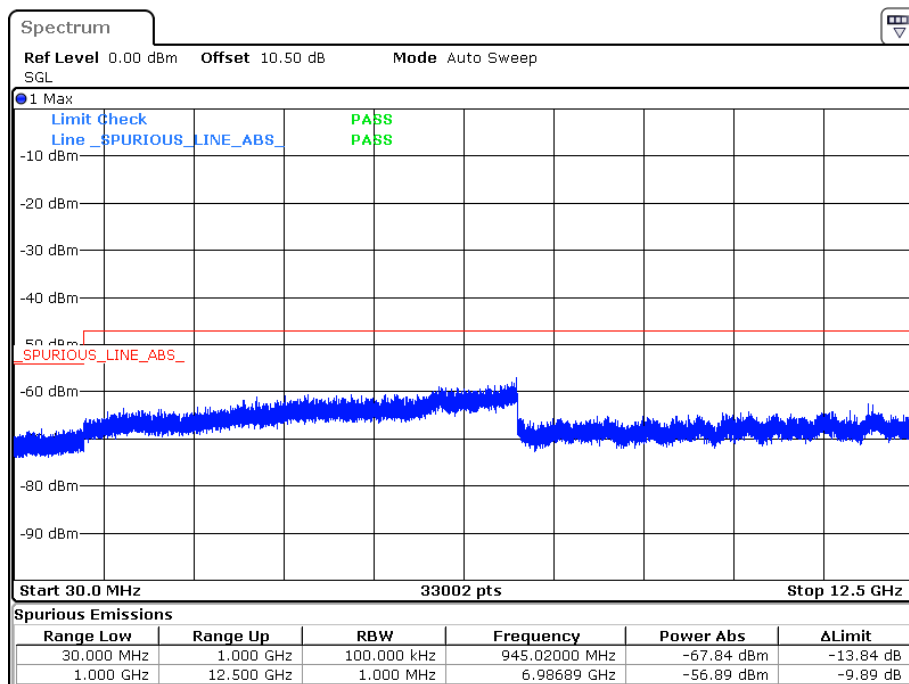
Please refer to the below plots

BLE_1M**Low Channel:****30MHz-12.5GHz**

Date: 2.AUG.2023 00:21:52

Middle Channel:**30MHz-12.5GHz**

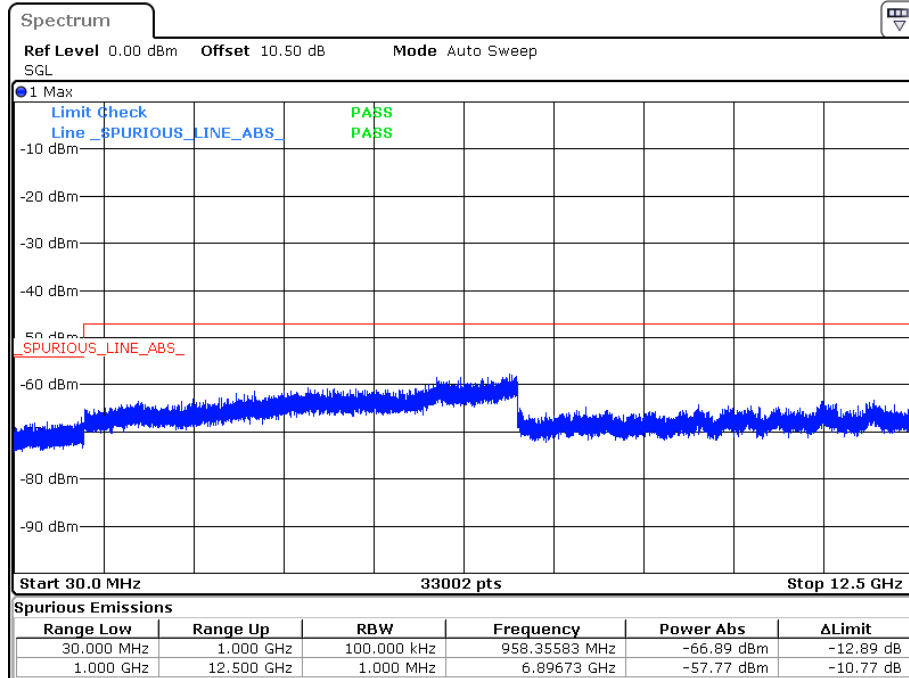
Date: 2.AUG.2023 00:22:45

High Channel:**30MHz-12.5GHz**

Date: 2.AUG.2023 00:23:39

BLE_2M
Low Channel:

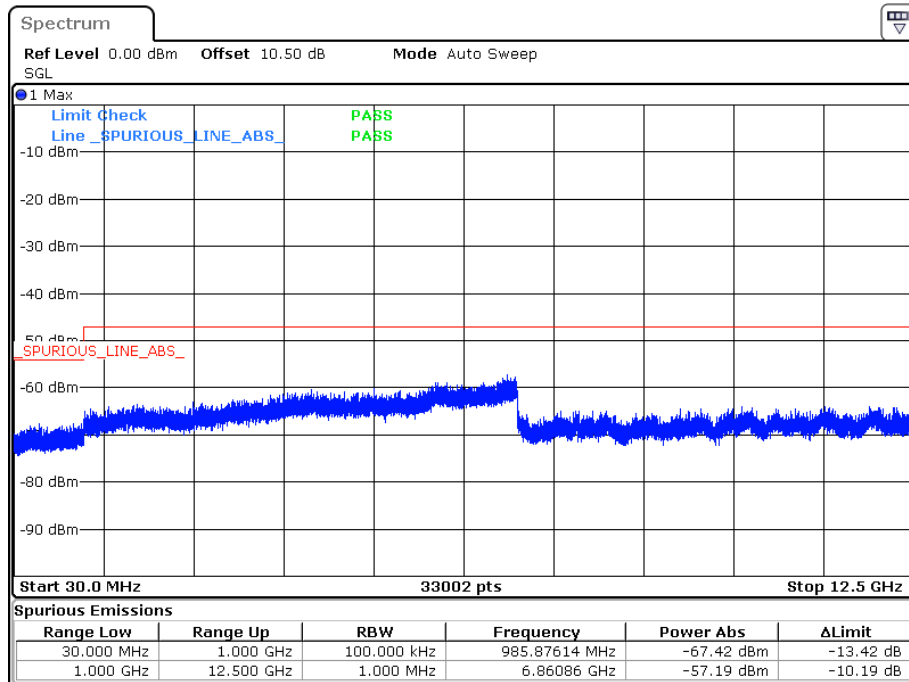
30MHz-12.5GHz



Date: 2.AUG.2023 00:18:05

Middle Channel:

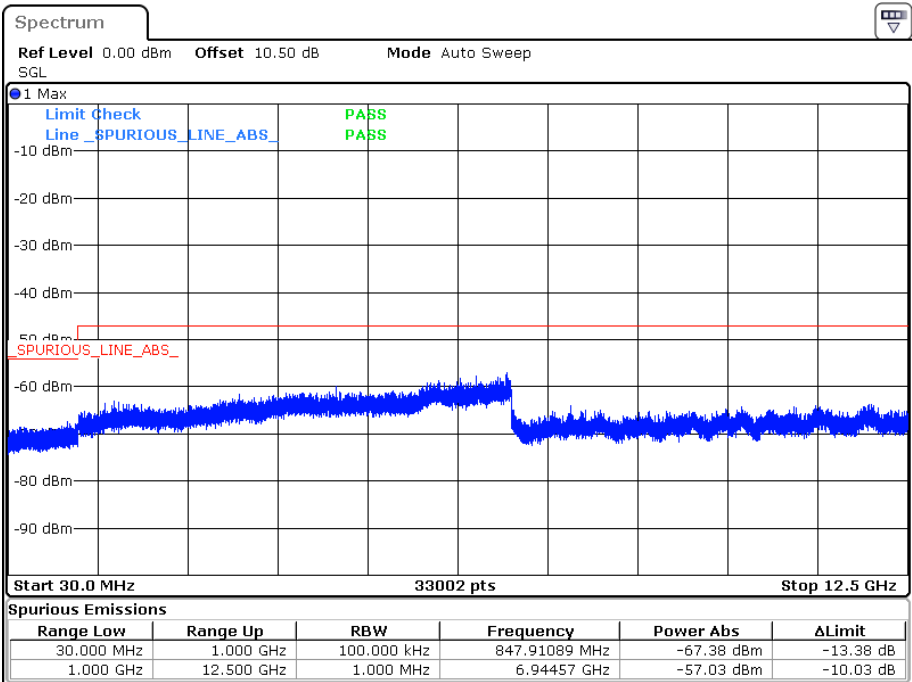
30MHz-12.5GHz



Date: 2.AUG.2023 00:18:59

High Channel:

30MHz-12.5GHz



Date: 2.AUG.2023 00:19:51

INTERFERENCE PREVENTION FUNCTION

Requirement

The EUT shall have the interference prevention capability to transmit or to receive the identification automatically, so that sender and receiver shall exclude other equipment.

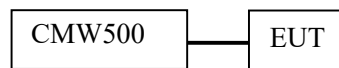
Test Procedure

In the case that the EUT has the function of automatically transmitting the identification code:

1. Transmit the predetermined identification codes from EUT
2. Check the transmitted identification codes with the demodulator.

In the case of receiving the identification codes:

1. Transmit the predetermined identification codes from the counterpart.
2. Check if communication is normal
3. Transmit the signal other than predetermined ID codes from the counterpart.
4. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.



Test Data

Environmental Conditions

Temperature:	27.3 °C
Relative Humidity:	47.4 %
ATM Pressure:	101.0 kPa

The testing was performed by Bruce Lin on 2023-08-01.

Test Result: Good.

CONSTRUCTION PROTECTION CONFIRMATION

Limit

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

Confirmation Method

The EUT case was fixed using the glue which can't be opened easily, please see the EUT photos.

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