CONFORMANCE TEST REPORT
FOR
FCC 47 CFR, Part 15 Subpart C

Report No.: 21-05-MAW-007-02

Client:	KAIWOOD Technology Co., Ltd.
Product:	Rapid Test Reader
Model:	CHR-631W, CHR-63xy (x can be 0~9 for different shell colors, y can be W for enabling WiFi and bluetooth functions, or not shown for disabling wireless functions.) For example, CHR-631.
FCC ID:	VGG-KWCHR006
Manufacturer/supplier:	KAIWOOD Technology Co., Ltd.
Date test item received:	2021/05/07
Date test campaign completed:	2022/01/11
Date of issue:	2024/06/14

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Total number of pages of this test report: 57 pages
Total number of pages of photos: External photos 5 pages
Internal photos 10 pages
Setup photos 4 pages

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Manufacturer	: KAIWOOD Technology Co., Ltd.
Address	: 5F, No. 12 & 16, Lane 31, Sec. 1, Huandong Rd., Xinshi District, Tainan City 74146, Taiwan
EUT	: Rapid Test Reader
Trade name	: KAIWOOD
Model No.	: CHR-631W, CHR-63xy (x can be 0~9 for different shell colors, y can be W for enabling WiFi and bluetooth functions, or not shown for disabling wireless functions.) For example, CHR-631.
Power Source	: Adapter: Good Opportunity Electronic Co,.Ltd/GS2U-015-050-M Input: AC 100-240V~0.5A Output: DC 5.0V ⎓ 3000mA, 15W Max
Regulations applied	: FCC 47 CFR, Part 15 Subpart C

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The compliance test is only certified for the test equipment and the results of the testing report relate only to the item tested. The compliance test of this report was conducted in accordance with the appropriate standards. The test result(s) does not consider the uncertainty of measurement when the test standard(s) and/or test method which refer by the labs has the limit or judgments for the test result(s).

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1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : Rapid Test Reader
b) Trade Name : KAIWOOD
c) Model No. : CHR-631W, CHR-63xy (x can be 0~9 for different shell colors, y can be W for enabling WiFi and bluetooth functions, or not shown for disabling wireless functions.) For example, CHR-631.
d) FCC ID : VGG-KWCHR006

1.2 Characteristics of Device

The EUT is a Rapid Test Reader based on the Bluetooth Low Energy Ltechnology. It conforms to the BLE protocal and operates in the unlicensed ISM Band at 2.4 GHz. The rated output power is 7.62 dBm (5.78 mW).

1.3 Test Methodology

All testing were performed according to the procedures in ANSI C63.10(2013) and FCC CFR 47 Part 2 and Part 15 and KDB 558074 D01 15.247 Meas Guidance v05r02.

1.4 Test Facility

The Semi-Anechoic Chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wenming Rd., Guishan Dist., Taoyuan City 33383, Taiwan, R.O.C.

This site has been accreditation as a FCC filing site.

1.5 Test Summary

Requirement	FCC Paragraph #	Test Pass
Antenna Requirement	15.203,15.247 (c)	☒
Conducted Emission	15.207	☒
Emission Bandwidth	15.247 (a)(2)	☒
Output Power Requirement	15.247 (b)(3)	☒
Power Density Requirement	15.247 (e)	☒
Spurious Emissions	15.247 (d)	☒
Radiated Emission	15.247 (d)	☒

Note: The test setup and measurement method for conductive output power measurements shown in this test report is different to the "Peak Output Power" test. Certain measurement uncertainty of peak power may be expected with the use of different power detection method or measuring equipment. Therefore, the conductive output power measurement results provided in this test report may be different to the specification of the device under test.

2 PROVISIONS APPLICABLE

2.1 Definition

Unintentional radiator:
A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:
A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :
A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Requirement for Compliance

(1) Conducted Emission Requirement

For unintentional device, according to §15.107(a) Line Conducted Emission Limits is as following:

Frequency MHz	Quasi Peak dB μV	Average dB μV
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

*Decreases with the logarithm of the frequency.

For intentional device, according to §15.207(a) Line Conducted Emission Limits is same as above table.

(2) Radiated Emission Requirement

For unintentional device, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dB μV/m	Radiated μV/m
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
above 960	3	54.0	500

For intentional radiator device, according to §15.209(a), the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

(3) Antenna Requirement

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

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(4) Bandwidth Requirement

According to 15.247 (a)(2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

(5) Output Power Requirement

According to 15.247(b)(3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(6) Spurious Emissions Measurement

According to 15.247 (d) , in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, 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) (see Section 15.205(c)).

(7) Power Density Requirement

According to 15.247 (e) , for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

2.3 Restricted Bands of Operation

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

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

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

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

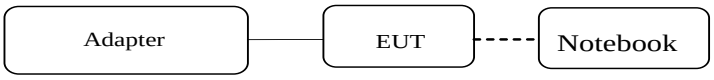
-- Consult the dealer or an experienced radio / TV technician for help.

3. SYSTEM TEST CONFIGURATION

3.1 Devices for Tested System

Device	Trade Name	Model No.	Cable Description
*Rapid Test Reader	KAIWOOD	CHR-631W	Adapter: Good Opportunity Electronic Co,.Ltd/GS2U-015-050-M Input: AC 100-240V~0.5A Output: DC 5.0V ⎓ 3000mA, 15W Max
Notebook	HP	Probook 650G1	0.8m*1 Unshielded USB Cable

Remark: 1. "*" means equipment under test.



After completing the test mode setting, Notebook is removed from the above test configuration for final test to reduce noise interference.

2.

Test Software:	adb.exe
Power Setting:	Default

3.2 Dscription of Test modes

There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2402
Middle	2440
High	2480

3.2.2 Test Mode Description

3.2.2.1 Modulation Type

Test Mode	Modulation	Note
A	GFSK	-

3.2.2.2 Test Mode and Worse Case Determination

The EUT was set in continuous operation function for all measurements.

Item	Test Item	Test Mode	Test Frequency (MHz)
1	Conducted Emission	A	-
2	Emission Bandwidth	A	L，M，H
3	Output Power Requirement	A	L，M，H
4	Power Density Requirement	A	L，M，H
5	Spurious Emissions	A	L，M，H
6	Radiated Emission	A	L，M，H
6.1	Radiated Emission (below 1GHz)	A	M (Worse Case)
6.2	Radiated Emission (above 1GHz)	A	L，M，H

Note :The worse case is chosen by channel middle which emission has no difference with others'.

3.3 Test site

Item	Test site
1	■ RE02 — EMC B1 — N2
2	■ CE04 — 10M 2F
3	■ RF — Cond01
4	□ RF — Cond02

4 CONDUCTED EMISSION MEASUREMENT

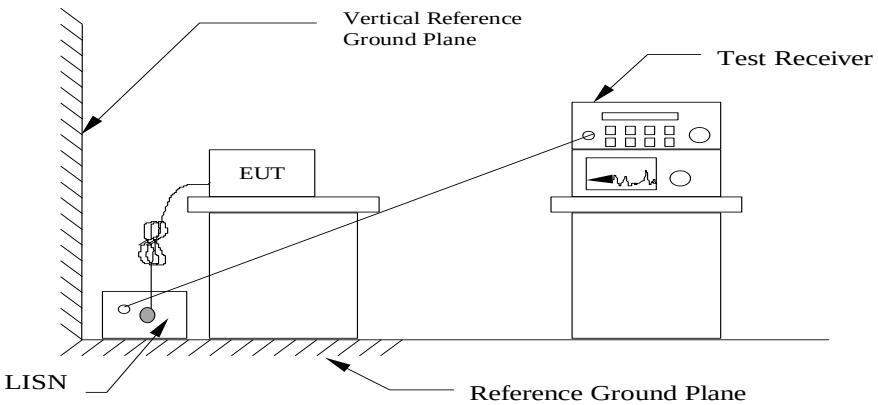
4.1 Standard Applicable

Line Conducted Emission Limits are in accordance to §§15.207(a).

4.2 Measurement Procedure

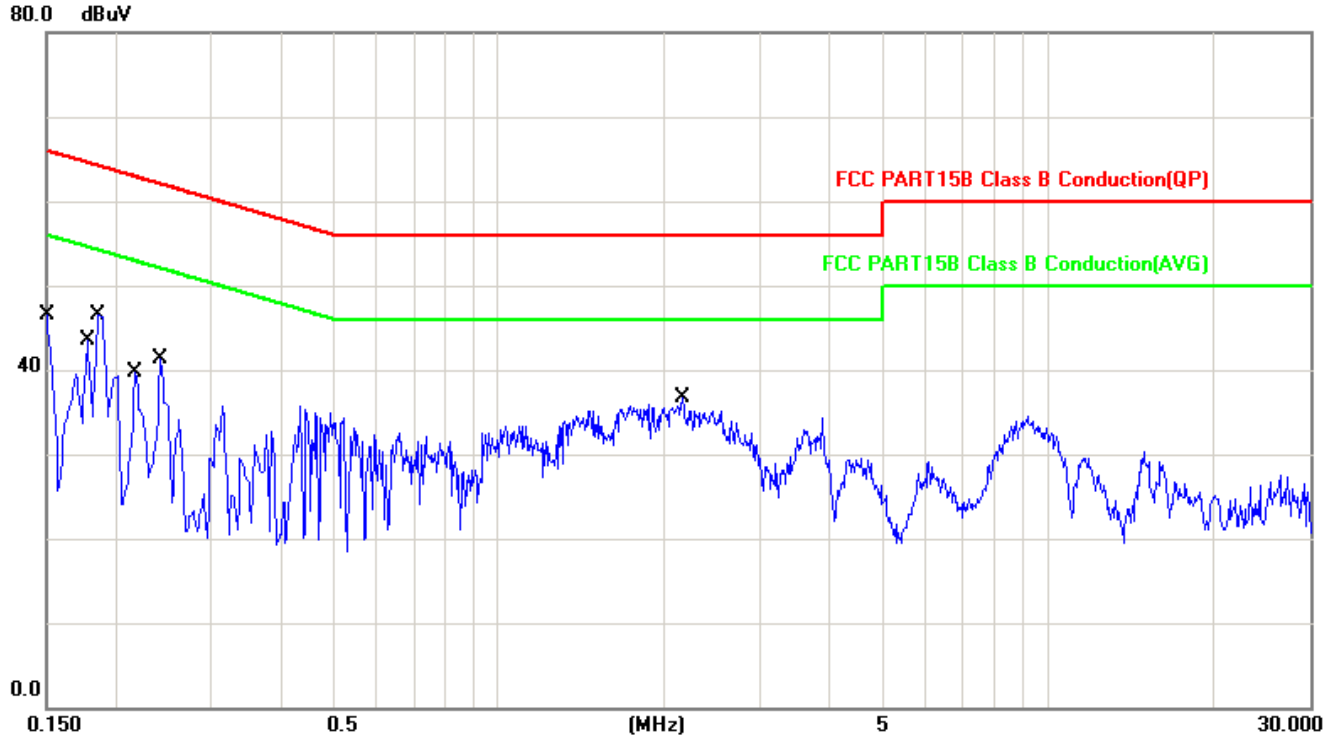
1. The testing follows ANSI C63.10(2013).
2. Setup the configuration per figure 1.
3. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
4. Record the 6 highest emissions relative to the limit.
5. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
6. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
7. Repeat all above procedures on measuring each operation mode of EUT.

Figure 1: Conducted emissions measurement configuration



4.3 Conducted Emission Data

File:	**21-05-MAW-007**	**#5**	**Date:**	**2021/12/23**	**Temperature:**	**24 ℃**
			Time:	**PM 06:21:47**	**Humidity:**	**58 %**



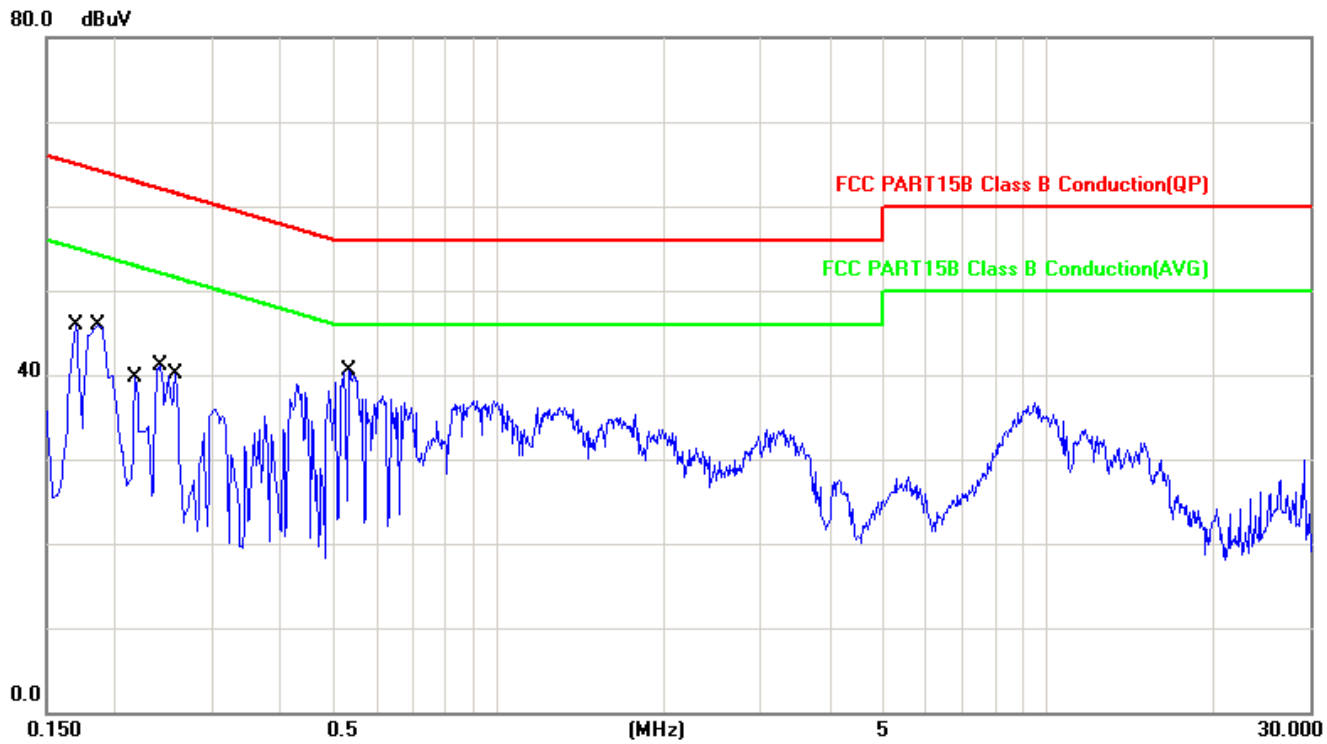
Site:	**CE04-10M 2F**		
Condition:	**FCC PART15B Class B Conduction(QP)**	**Phase:**	**L1**
EUT:	**Rapid Test Reader**	**Power:**	**AC 110V/60Hz**
Model:	**CHR-631**		
Test Mode:	**BLE**	**Operator:**	**Phillip**

No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.150	36.85	QP	9.65	46.50	66.00	-19.50
2	0.178	33.90	QP	9.64	43.54	64.58	-21.04
*3	0.186	36.89	QP	9.64	46.53	64.21	-17.68
4	0.218	29.98	QP	9.64	39.62	62.89	-23.27
5	0.242	31.73	QP	9.64	41.37	62.03	-20.66
6	2.166	26.93	QP	9.70	36.63	56.00	-19.37

Note: 1. Place of measurement: EMC LAB. of the ETC.
2. "***" means the value was too low to be measured.
3. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
4. "#" means the noise was too low, so record the peak value.
5. The estimated measurement uncertainty of the result measurement is ±2.5dB.
6. The estimated measurement uncertainty of the result measurement is: ±3.04dB(150kHz≦f≦30MHz)

File: **21-05-MAW-007** **#6** **Date:** **2021/12/23** **Temperature:** **24 ℃**

Time: **PM 06:23:06** **Humidity:** **58 %**



Site: **CE04-10M 2F**

Condition: **FCC PART15B Class B Conduction(QP)** **Phase:** **N**

EUT: **Rapid Test Reader** **Power:** **AC 110V/60Hz**

Model: **CHR-631**

Test Mode: **BLE** **Operator:** **Phillip**

No.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	0.170	36.39	QP	9.59	45.98	64.96	-18.98
2	0.186	36.34	QP	9.58	45.92	64.21	-18.29
3	0.218	30.14	QP	9.58	39.72	62.89	-23.17
4	0.242	31.48	QP	9.58	41.06	62.03	-20.97
5	0.258	30.46	QP	9.58	40.04	61.50	-21.46
*6	0.534	30.84	QP	9.59	40.43	56.00	-15.57

Note: 1. Place of measurement: EMC LAB. of the ETC.
2. "***" means the value was too low to be measured.
3. If the data table appeared symbol of "----" means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
4. "#" means the noise was too low, so record the peak value.
5. The estimated measurement uncertainty of the result measurement is ±2.5dB.
6. The estimated measurement uncertainty of the result measurement is: ±3.04dB(150kHz≦f≦30MHz)

4.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR (Included Cable Loss)

4.5 Conducted Measurement Equipment

The following test equiPMent are used during the conducted test.

Equipment	Manufacturer	Model No.
EMI Test Receiver	R&S	ESCI
V-LISN	R&S	ENV216

Software: EZ-EMC (Ver. ETC-03A1)

5 ANTENNA REQUIREMENT

5.1 Standard Applicable

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

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.2 Antenna Construction and Directional Gain

The antenna is a Dipole Antenna.

Antenna Type	Dipole Antenna
Operation Frequency Range	2.4 - 2.5 GHz
Peak Antenna Gain	3.2 dBi

Remark: The antenna specification is provided by manufacturer/applicant to ETC as reference. We, ETC, trust manufacturer/applicant's antenna specification is true. If there is any loss or damage occurred, the responsibility goes to manufacturer/applicant.

The directional gain of antenna doesn't greater than 6 dBi, the power won't be reduced.

6 EMISSION BANDWIDTH MEASUREMENT

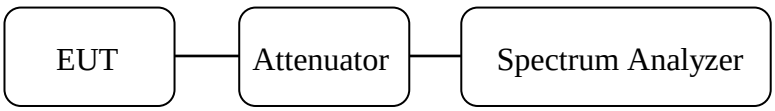
6.1 Standard Applicable

According to 15.247(a)(2), systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 Measurement Procedure

1. The testing follows FCC KDB 558074 D01 15.247 Meas Guidance v05r02.
2. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
3. Position the EUT as shown in figure 2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
4. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

Figure 2: Emission bandwidth measurement configuration.



6.3 Measurement Equipment

Equipment	Trade Name	Model No.
Spectrum Analyzer	R&S	FSV40
Attenuator	WEINSCHEL	56-10

Software: LZ-RF (Ver. ETC-3A2)

6.4 Measurement Data

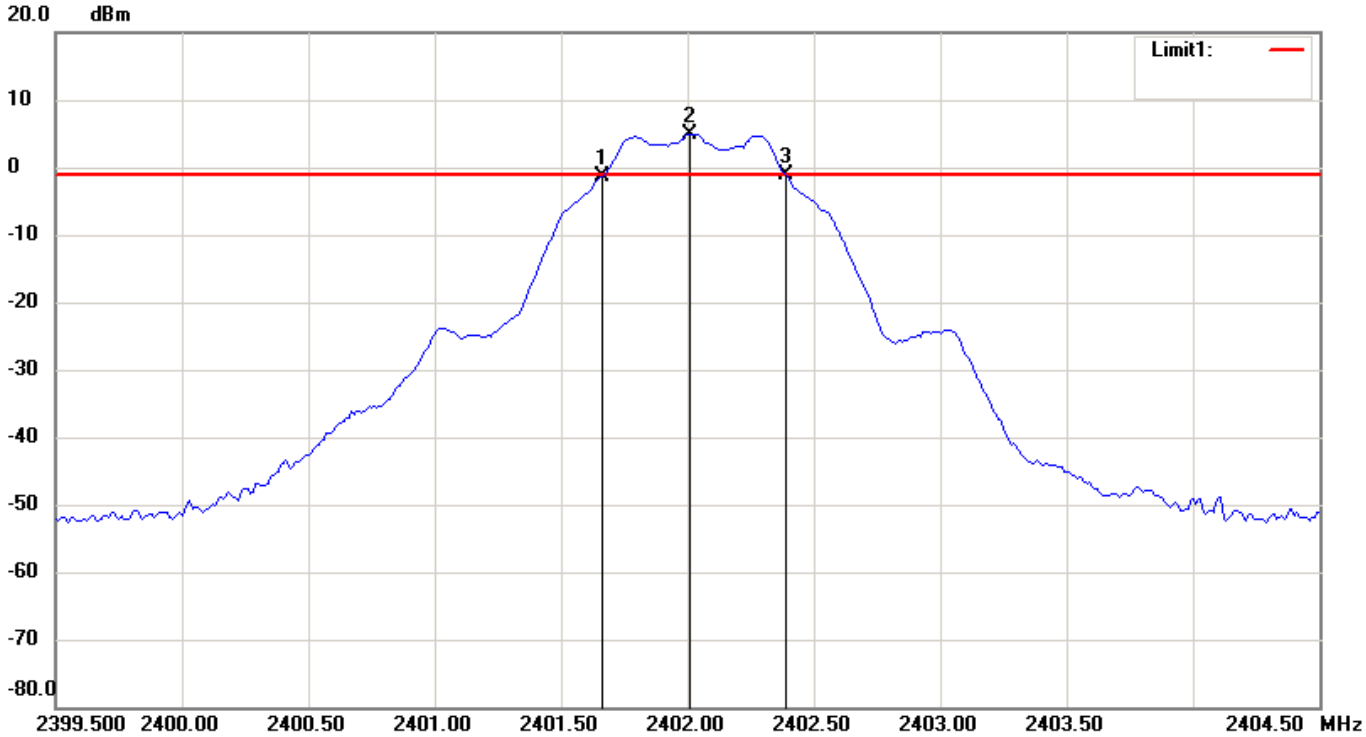
Test Aug. 04, 2021 Temperature: 24℃ Humidity: 50%

Channel	6dB Bandwidth (MHz)	FCC Limit (kHz)	Chart
L	0.73	500	Page 21
M	0.72	500	Page 22
H	0.73	500	Page 23

Note:
Please refer to page 21 to page 23 for chart

File: **21-05-MAW-007_BLE** **#2** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**



Condition: **-1.07dBm** **RF Conducted**

EUT: **Rapid Test Reader** **Sweep Time: 1ms** **Att.: 25dB**

Model: **CHR-631** **RBW: 100 KHz** **VBW: 300 KHz**

Test Mode: **BLE** **Operator:** **Phillip**

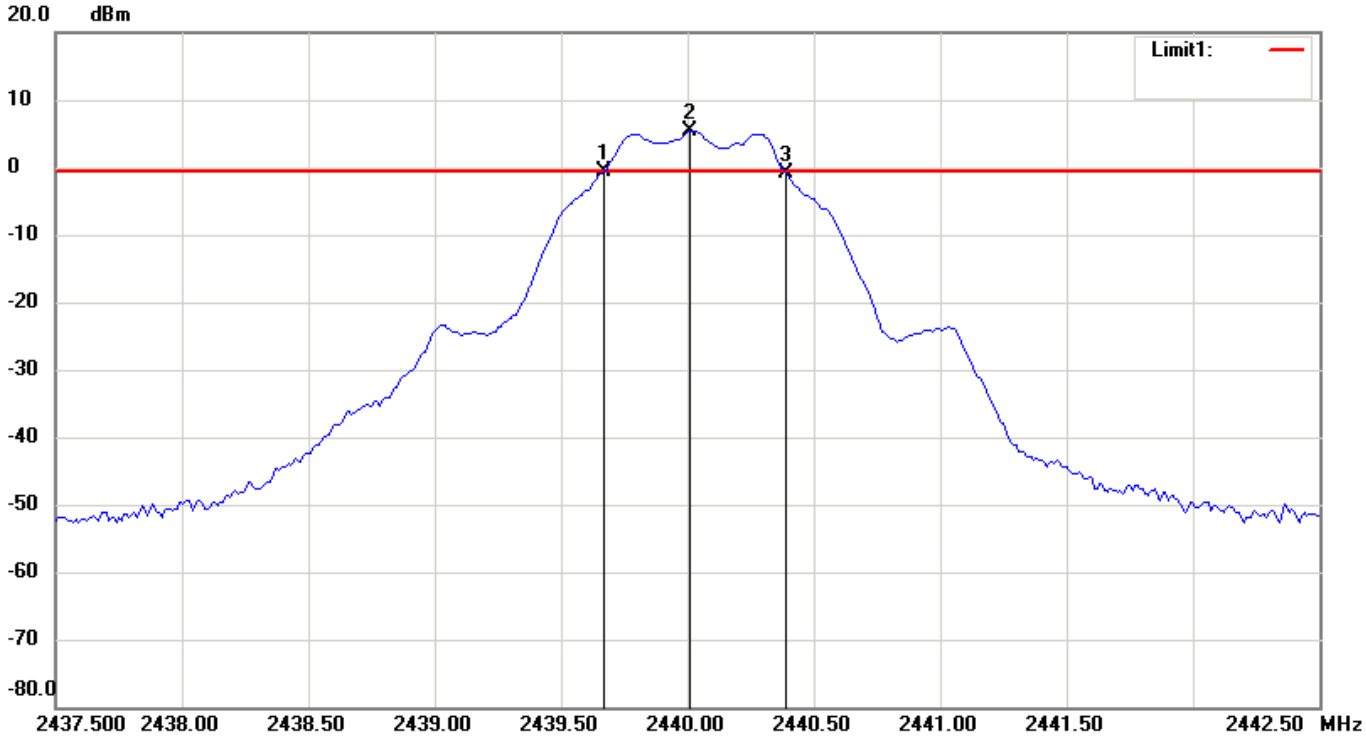
Note: **FCC_Channel LOW-6dB EBW**

No.	Frequency(MHz)	Level(dBm)
1	2401.66000	-1.33
2	2402.01000	4.93
3	2402.39000	-1.13

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	0.73	0.2

File: **21-05-MAW-007_BLE** **#7** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: RF-Cond01 **Humidity: 50 %**



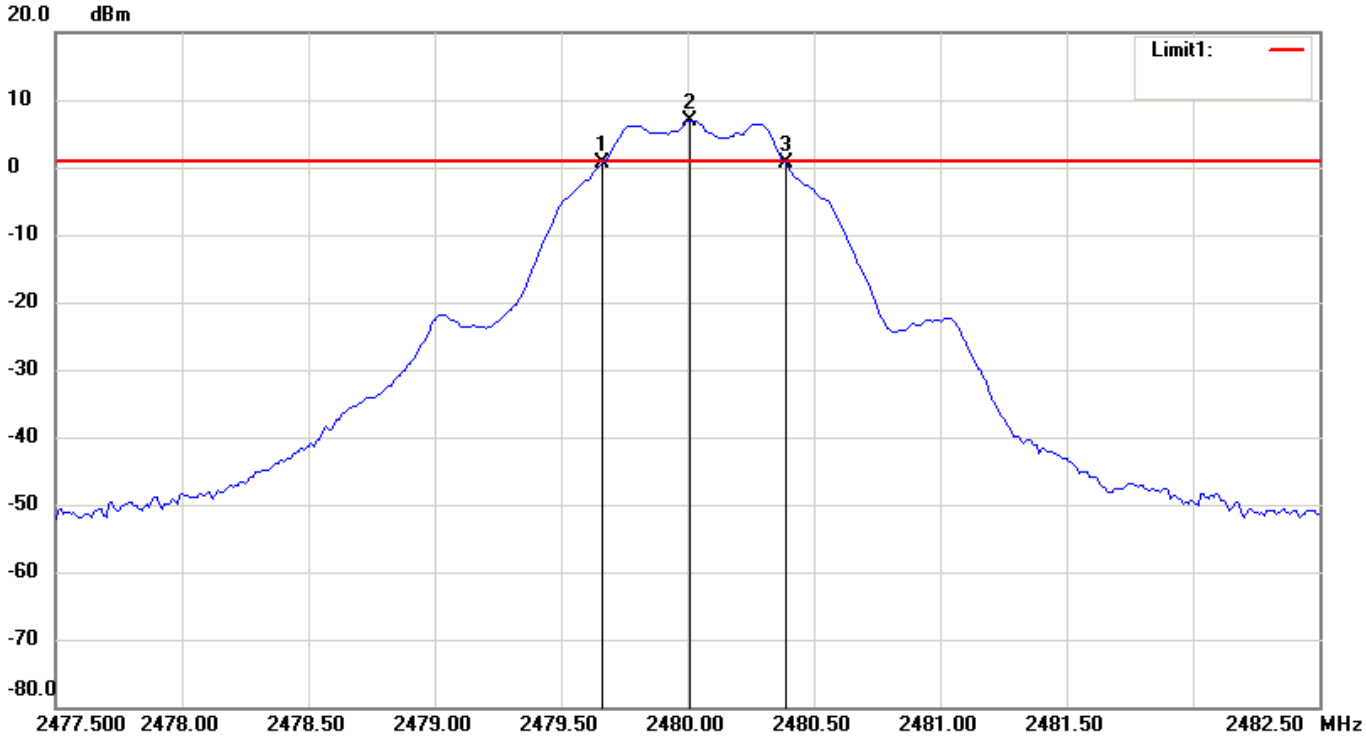
Condition:	**-0.65dBm**	**RF Conducted**	
EUT:	**Rapid Test Reader**	**Sweep Time: 1ms**	**Att.: 25dB**
Model:	**CHR-631**	**RBW: 100 KHz**	**VBW: 300 KHz**
Test Mode:	**BLE**	**Operator:**	**Phillip**
Note:	**FCC_Channel MID-6dB EBW**		

No.	Frequency(MHz)	Level(dBm)
1	2439.67000	-0.65
2	2440.01000	5.35
3	2440.39000	-0.84

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	0.72	-0.19

File: **21-05-MAW-007_BLE** **#11** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**



Condition: **0.85dBm** **RF Conducted**

EUT: **Rapid Test Reader** **Sweep Time: 1ms** **Att.: 25dB**

Model: **CHR-631** **RBW: 100 KHz** **VBW: 300 KHz**

Test Mode: **BLE** **Operator:** **Phillip**

Note: **FCC_Channel HIGH-6dB EBW**

No.	Frequency(MHz)	Level(dBm)
1	2479.66000	0.58
2	2480.01000	6.85
3	2480.39000	0.61

No.		△Frequency(MHz)	△Level(dB)
1	mk3-mk1	0.73	0.03

7 OUTPUT POWER MEASUREMENT

7.1 Standard Applicable

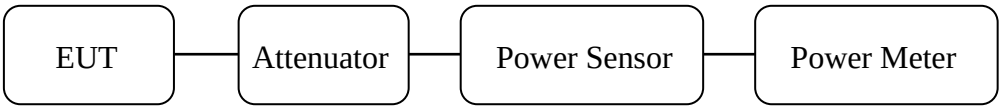
According to 15.247(b)(3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi..

7.2 Measurement Procedure

1. The testing follows FCC 558074 D01 15.247 Meas Guidance v05r02.
2. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
3. Position the EUT as shown in figure 3. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range.
4. Measure the highest value appearing on power meter and record the level to calculate result data.
5. Repeat above procedures until all frequencies measured were complete.

Figure 3: Output power measurement configuration.



7.3 Measurement Equipment

Equipment	Trade Name	Model No.
Power Meter	Agilent	N1912A
Power Sensor	Agilent	N1922A
Attenuator	WEINSCHEL	56-10

Software: LZ-RF (Ver. ETC-3A2)

7.4 Measurement Data

Test Aug. 04, 2021 Temperature: 24℃ Humidity: 50%

Channel	Maximum Peak Output Power (dBm)	FCC Limit (dBm)	Chart
L	5.63	30.0	-
M	6.07	30.0	-
H	7.62	30.0	-

Note:

The estimated measurement uncertainty of the result measurement is ±1.5dB(1GHz≦f≦18GHz)

8 POWER DENSITY MEASUREMENT

8.1 Standard Applicable

According to 15.247(e), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

8.2 Measurement Procedure

1. The testing follows FCC FCC 558074 D01 15.247 Meas Guidance v05r02.
2. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
3. Position the EUT as shown in figure 2. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set EUT to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
4. Adjust the center frequency of spectrum analyzer on highest level appearing on spectral display within a 300 kHz frequency span.
5. Set the spectrum analyzer on a 3 kHz resolution bandwidth and 10 kHz video bandwidth as well as max. hold function, then record the measurement result.
6. Repeat above procedures until all measured frequencies were complete.

8.3 Measurement Equipment

Equipment	Trade Name	Model No.
Spectrum Analyzer	R&S	FSV40
Attenuator	WEINSCHEL	56-10

Software: LZ-RF (Ver. ETC-3A2)

8.4 Measurement Data

Test Aug. 04, 2021 Temperature: 24℃ Humidity: 50%

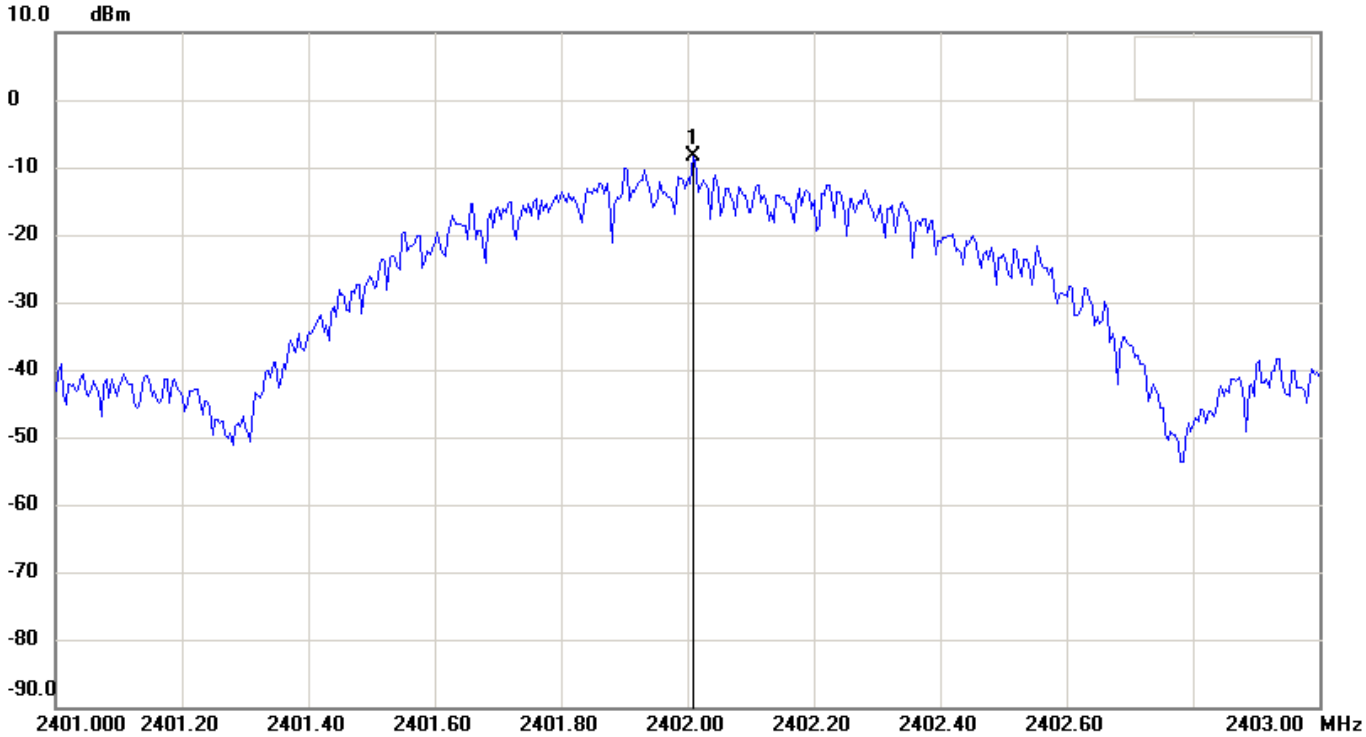
Channel	Peak Power Spectral Density (dBm)	FCC Limit (dBm)	Chart
L	-8.45	8	Page 28
M	-7.96	8	Page 29
H	-6.47	8	Page 30

Note:

1. *Please refer to page 28 to page 30 for chart*
2. *The estimated measurement uncertainty of the result measurement is ±1.5dB(1GHz≦f≦18GHz)*

File: **21-05-MAW-007_BLE** **#4** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**



Condition: **RF Conducted**

EUT: **Rapid Test Reader** **Sweep Time: 22.3ms** **Att.: 15dB**

Model: **CHR-631** **RBW: 3 KHz** **VBW: 10 KHz**

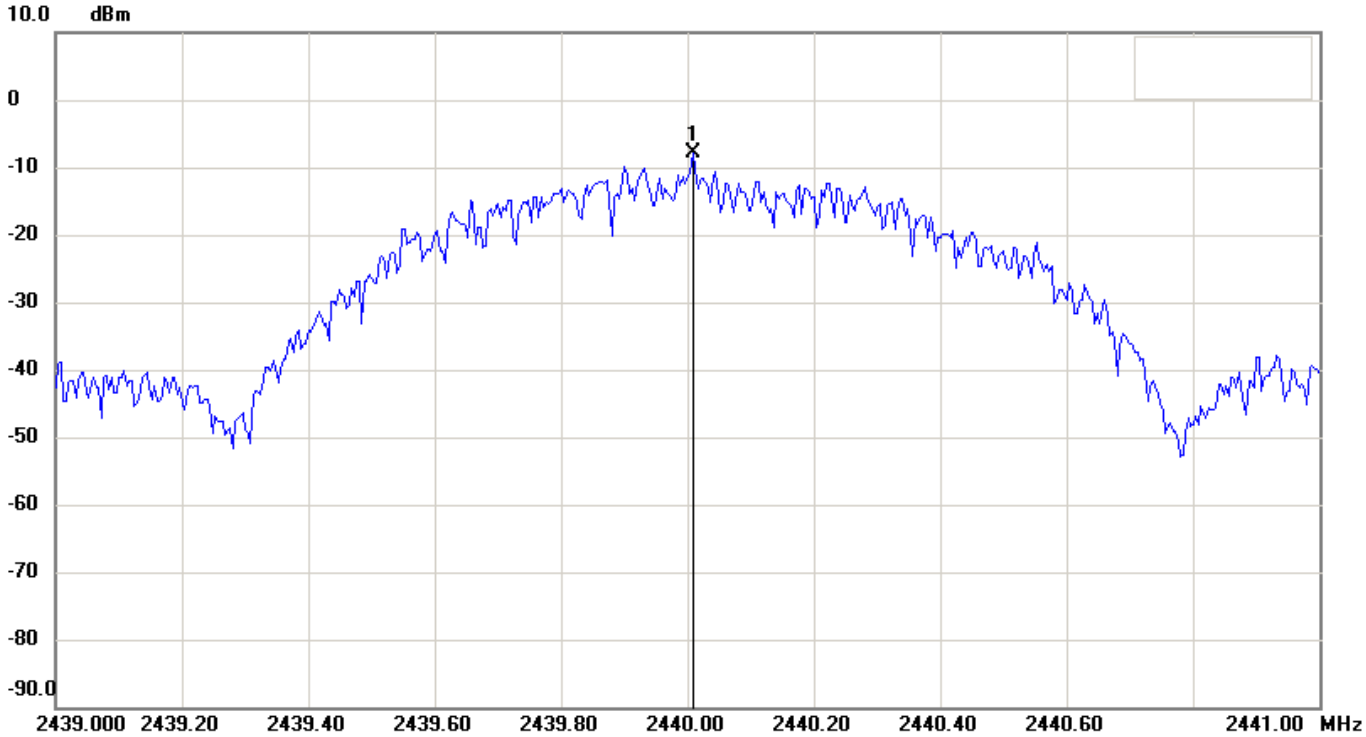
Test Mode: **BLE** **Operator:** **Phillip**

Note: **FCC_Channel LOW-Power Density (PK)**

No.	Frequency(MHz)	Level(dBm)
1	2402.00800	-8.45

File: **21-05-MAW-007_BLE** **#9** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**

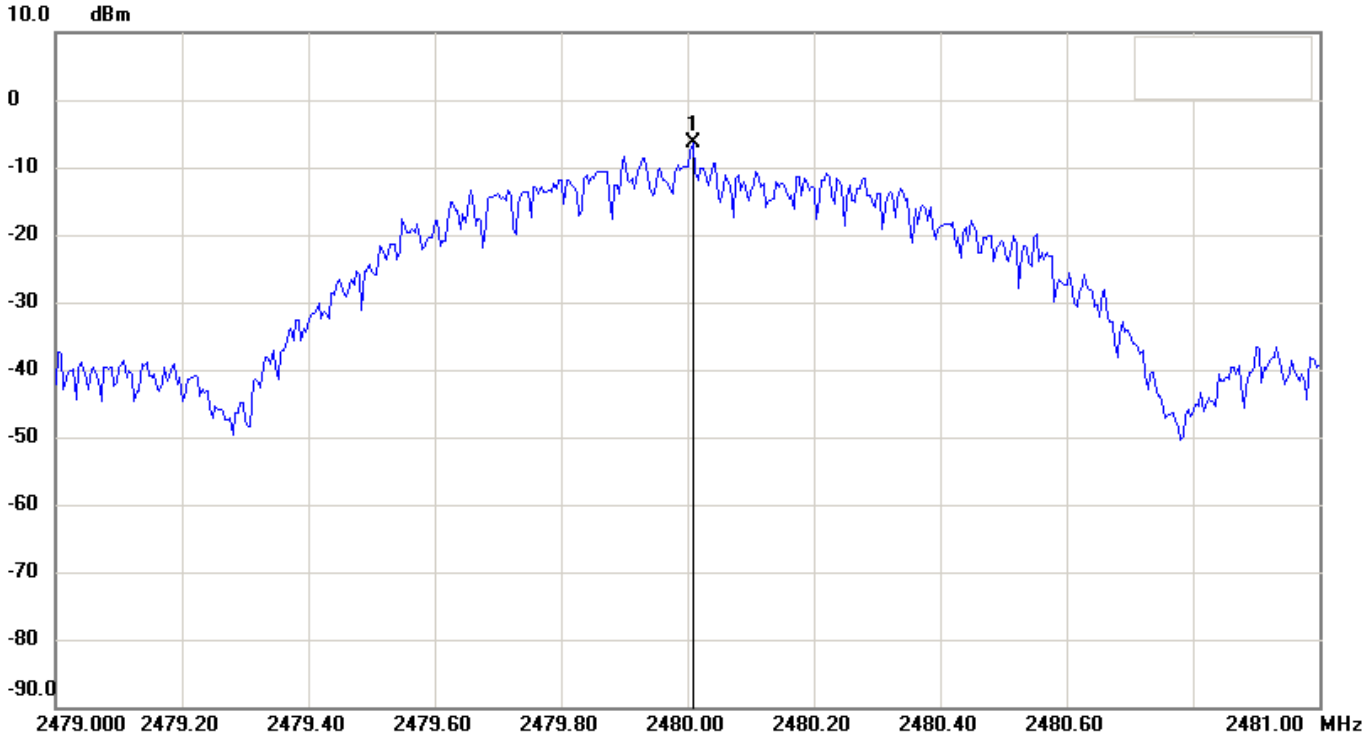


Condition:		**RF Conducted**	
EUT:	**Rapid Test Reader**	**Sweep Time: 22.3ms**	**Att.: 15dB**
Model:	**CHR-631**	**RBW: 3 KHz**	**VBW: 10 KHz**
Test Mode:	**BLE**	**Operator:**	**Phillip**
Note:	**FCC_Channel MID-Power Density (PK)**		

No.	Frequency(MHz)	Level(dBm)
1	2440.00800	-7.96

File: **21-05-MAW-007_BLE** **#13** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**



Condition: **RF Conducted**

EUT: **Rapid Test Reader** **Sweep Time: 22.3ms** **Att.: 15dB**

Model: **CHR-631** **RBW: 3 KHz** **VBW: 10 KHz**

Test Mode: **BLE** **Operator:** **Phillip**

Note: **FCC_Channel HIGH-Power Density (PK)**

No.	Frequency(MHz)	Level(dBm)
1	2480.00800	-6.47

9 SPURIOUS EMISSION - RF CONDUCTED MEASUREMENT

9.1 Standard Applicable

According to 12.247 (d) , in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, 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) (see Section 15.205(c)).

9.2 Measurement Procedure

1. The testing follows FCC 558074 D01 15.247 Meas Guidance v05r02.
2. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
3. Position the EUT as shown in figure 2. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
4. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
5. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
6. Repeat above procedures until all measured frequencies were complete.

9.3 Measurement Equipment

Equipment	Trade Name	Model No.
Spectrum Analyzer	R&S	FSV40
Attenuator	WEINSCHEL	56-10

Software: LZ-RF (Ver. ETC-3A2)

9.4 Measurement Data

Test Aug. 04, 2021 Temperature: 24℃ Humidity: 50%

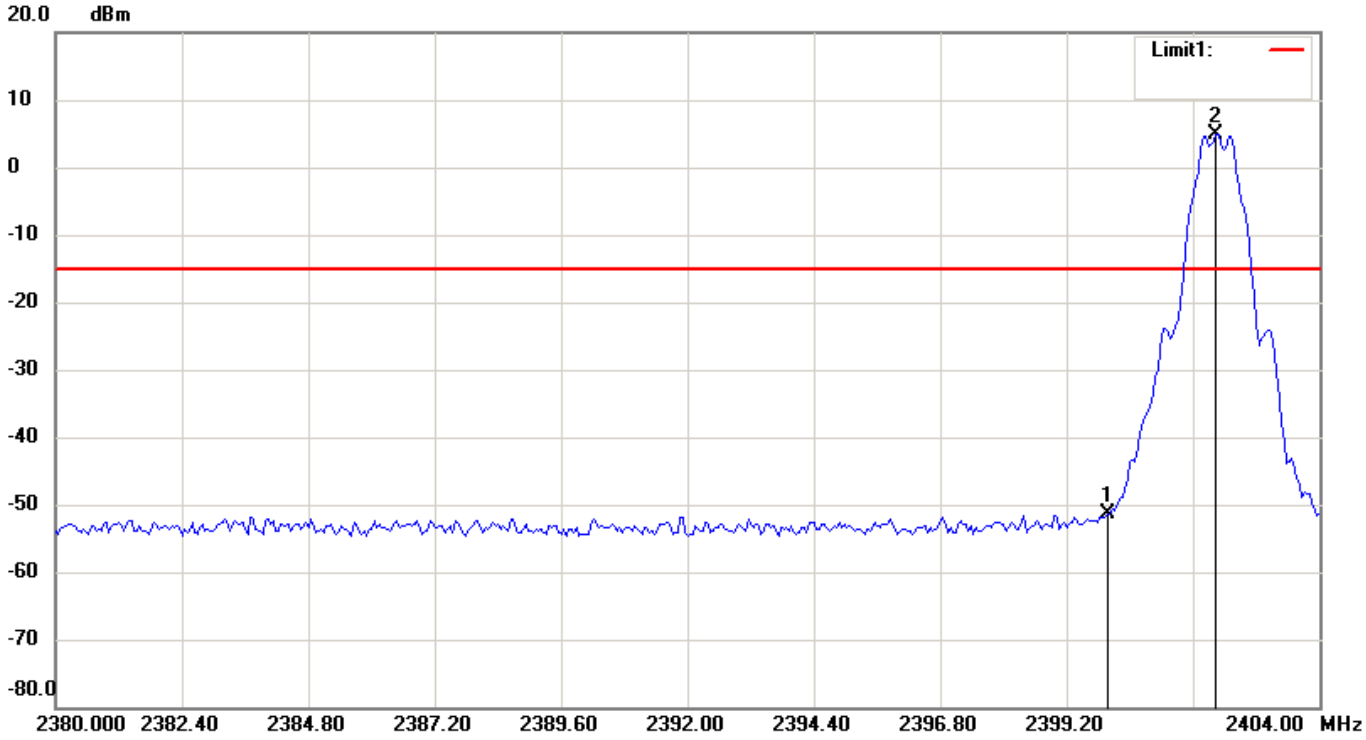
Channel	Frequency(MHz)	Chart
0	2402	Page 33, Page 35
19	2440	Page 36
39	2480	Page 34, Page 37

Frequency Band: 2400 MHz ~ 2483.5 MHz
All out-of –band conducted emissions were more than 20dB below the carrier.

Note: 1. Please refer to page 33 to page 37 for chart
2. An external attenuator is used as part of the test system for these measurements, the attenuation introduced by the external attenuator has not been explicitly compensated in the measured power level as it is irrelevant to these specific measurement results.

File: **21-05-MAW-007_BLE** **#5** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**

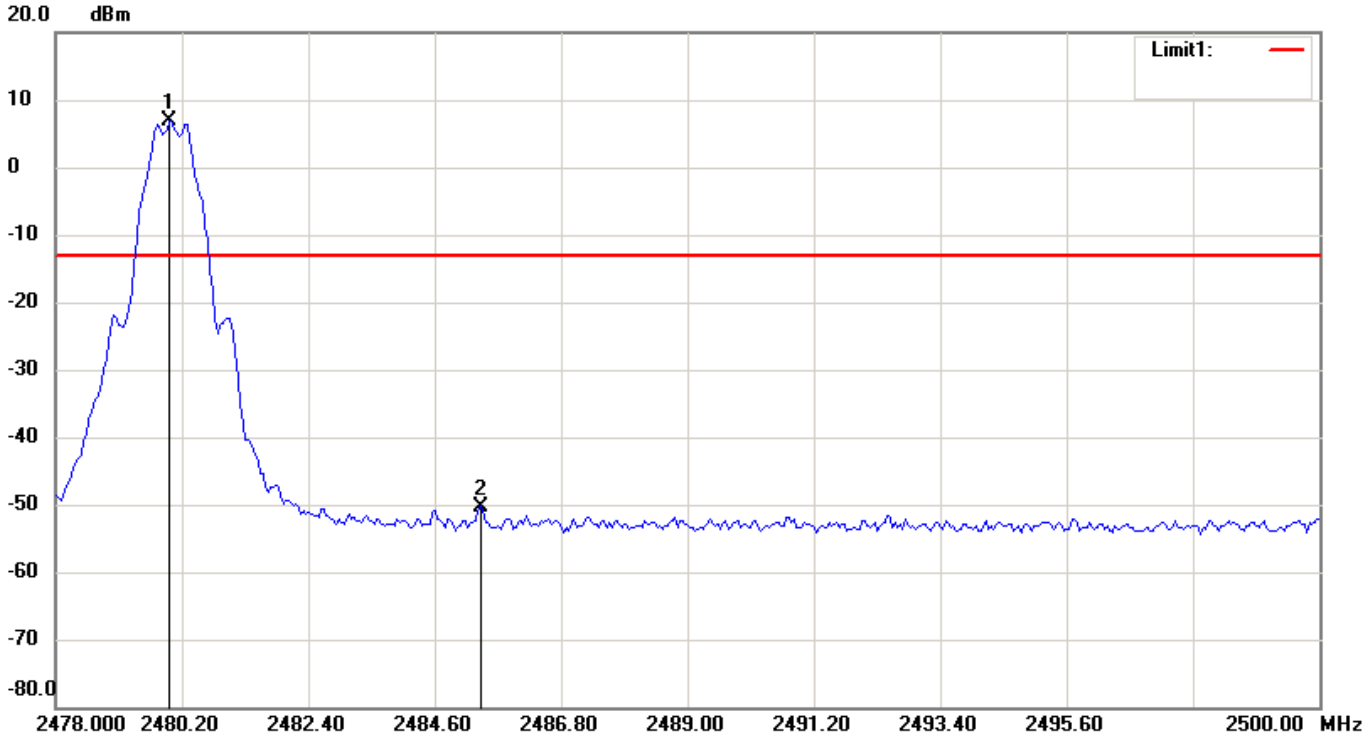


Condition:	**-15.14dBm**	**RF Conducted**	
EUT:	**Rapid Test Reader**	**Sweep Time: 1.01ms**	**Att.: 25dB**
Model:	**CHR-631**	**RBW: 100 KHz**	**VBW: 300 KHz**
Test Mode:	**BLE**	**Operator:**	**Phillip**
Note:	**FCC_Channel LOW-Bandedge**		

No.	Frequency(MHz)	Level(dBm)
1	2399.96800	-51.31
2	2402.03200	4.86

File: **21-05-MAW-007_BLE** **#14** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**

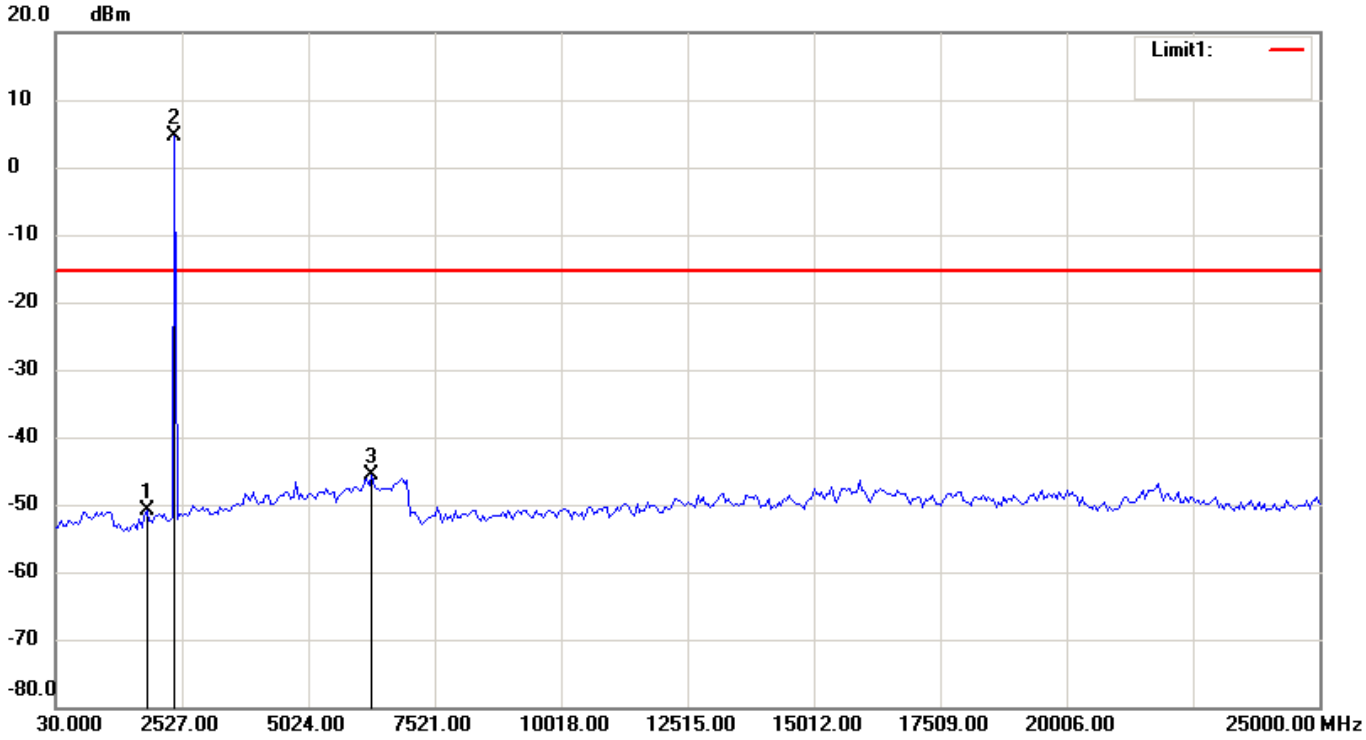


Condition:	**-13.19dBm**	**RF Conducted**	
EUT:	**Rapid Test Reader**	**Sweep Time: 1.02ms**	**Att.: 25dB**
Model:	**CHR-631**	**RBW: 100 KHz**	**VBW: 300 KHz**
Test Mode:	**BLE**	**Operator:**	**Phillip**
Note:	**FCC_Channel High-Bandedge**		

No.	Frequency(MHz)	Level(dBm)
1	2479.98000	6.81
2	2485.39200	-50.25

File: **21-05-MAW-007_BLE** **#3** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**



Condition: **-15.42dBm** **RF Conducted**

EUT: **Rapid Test Reader** **Sweep Time: 250ms** **Att.: 25dB**

Model: **CHR-631** **RBW: 100 KHz** **VBW: 300 KHz**

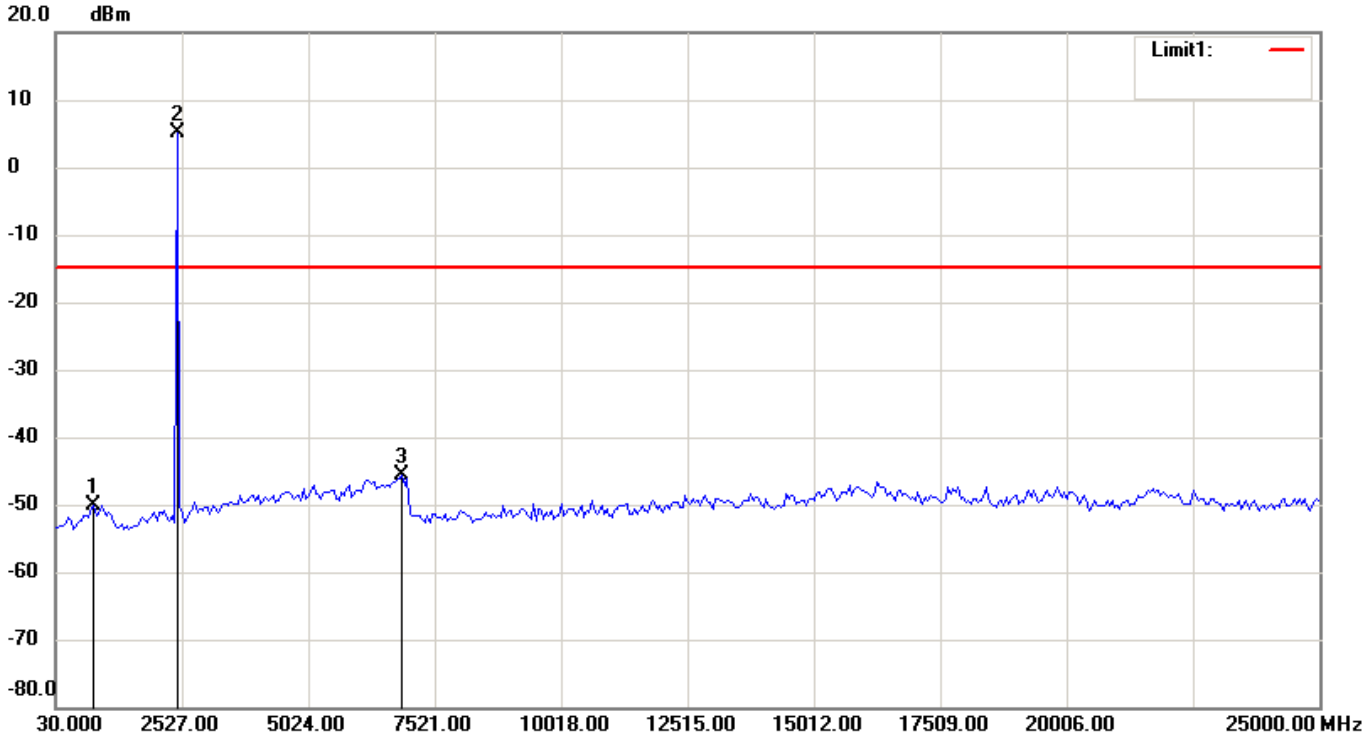
Test Mode: **BLE** **Operator:** **Phillip**

Note: **FCC_Channel LOW-Conducted Spurious**

No.	Frequency(MHz)	Level(dBm)
1	1827.84000	-50.81
2	2377.18000	4.58
3	6272.50000	-45.55

File: **21-05-MAW-007_BLE** **#8** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**



Condition: **-14.8dBm** **RF Conducted**

EUT: **Rapid Test Reader** **Sweep Time: 250ms** **Att.: 25dB**

Model: **CHR-631** **RBW: 100 KHz** **VBW: 300 KHz**

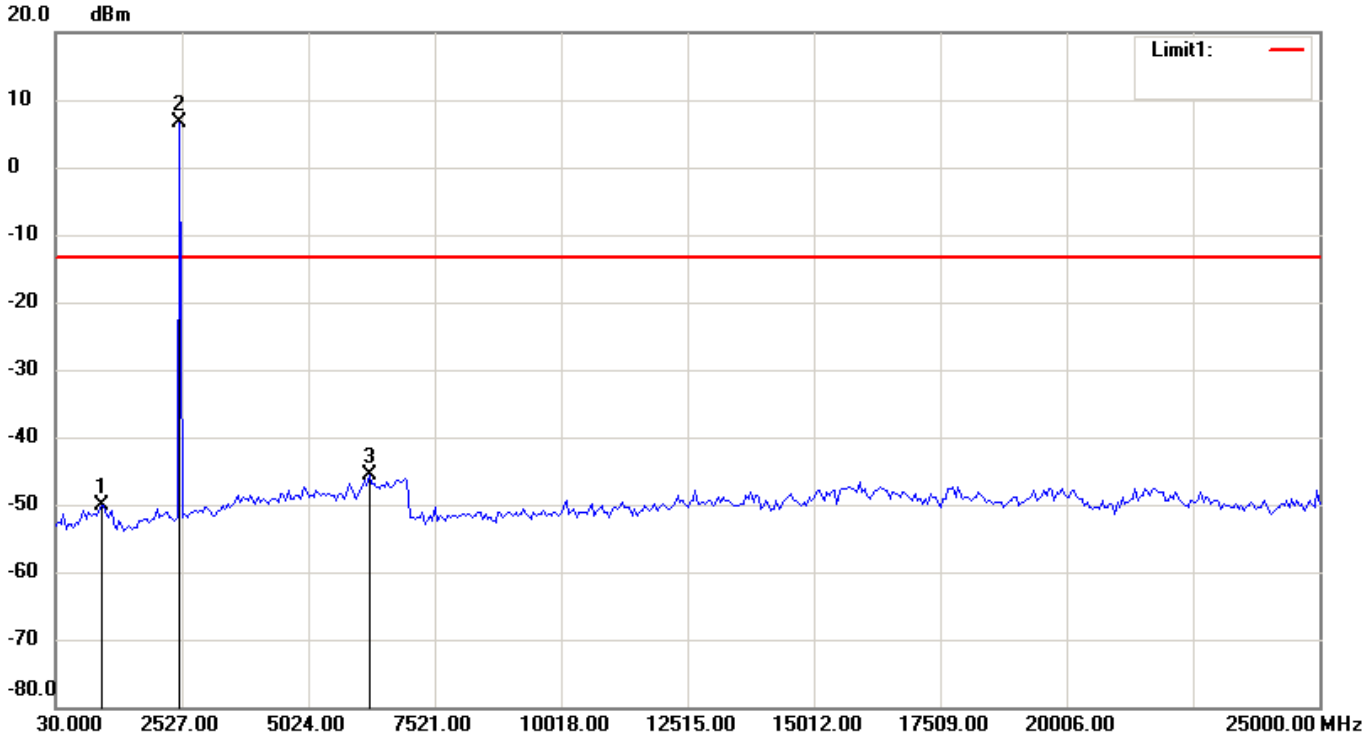
Test Mode: **BLE** **Operator:** **Phillip**

Note: **FCC_Channel MID-Conducted Spurious**

No.	Frequency(MHz)	Level(dBm)
1	779.1000	-50.07
2	2427.12000	5.20
3	6871.78000	-45.57

File: **21-05-MAW-007_BLE** **#12** **Date:** **2021/8/4** **Temperature:** **24 ℃**

Site: **RF-Cond01** **Humidity:** **50 %**



Condition: **-13.49dBm** **RF Conducted**

EUT: **Rapid Test Reader** **Sweep Time: 250ms** **Att.: 25dB**

Model: **CHR-631** **RBW: 100 KHz** **VBW: 300 KHz**

Test Mode: **BLE** **Operator:** **Phillip**

Note: **FCC_Channel HIGH-Conducted Spurious**

No.	Frequency(MHz)	Level(dBm)
1	928.9200	-50.13
2	2477.06000	6.51
3	6222.56000	-45.71

10 RADIATED EMISSION MEASUREMENT

10.1 Standard Applicable

For unintentional radiator, the radiated emission shall comply with §15.109(a).

For intentional radiators, according to §15.247 (a), operation under this provision is limited to frequency hopping and digitally modulated, and the out band emission shall be comply with § 15.247 (d)

10.2 Measurement Procedure

The testing follows FCC KDB 558074 D01 15.247 Meas Guidance v05r02.

A.Preliminary Measurement For Portable Devices.

For movable devices, the following procedure was performed to determine the maximum emission axis of EUT (X, Y and Z axis):

1. With the receiving antenna is H polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
2. With the receiving antenna is V polarization, rotate the EUT in turns with three orthogonal axes to determine the axis of maximum emission.
3. Compare the results derived from above two steps. The axis of maximum emission from EUT was determined and the configuration was used to perform the final measurement.
4. The position in which the maximum noise occurred was “Y axis”. (Please see the test setup photos)

B. Final Measurement

1. Setup the configuration per figure 4 to 6 for frequencies measured below and above 1 GHz respectively. Turn on EUT and make sure that it is in continuous operating function.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions and then each selected frequency is precisely measured. As the same purpose, for emission measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission measured below and above 1 GHz, set the spectrum analyzer on a 120 kHz and 1 MHz and 9 KHz resolution bandwidth respectively for each frequency measured in step 2.
4. For emission frequencies measured below 30 MHz, The measurement antenna shall be positioned with its plane perpendicular to the ground at the specified distance. When perpendicular to the ground plane, the lowest height of the magnetic antenna shall be 1 m above the ground and shall be positioned at the specified distance from the EUT. When the EUT contains a loop antenna that can only be placed in a vertical axis, normal measurements shall be made aligning the measurement antenna along the site axis, and then orthogonal to the axis. For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable. When the EUT contains a loop antenna that can be placed in a horizontal or vertical axis, normal measurements shall be made aligning the measurement antenna along the site axis, orthogonal to the axis, and then with the measurement antenna horizontal. For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable.

Figure 4: Frequencies measured below 1 GHz configuration

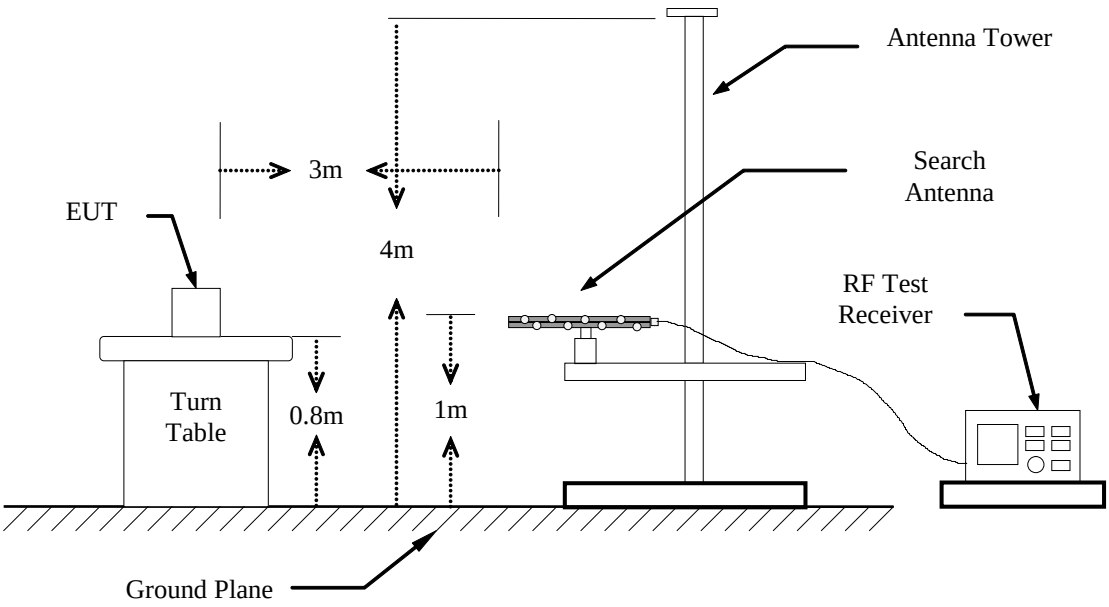


Figure 5: Frequencies measured above 1 GHz configuration

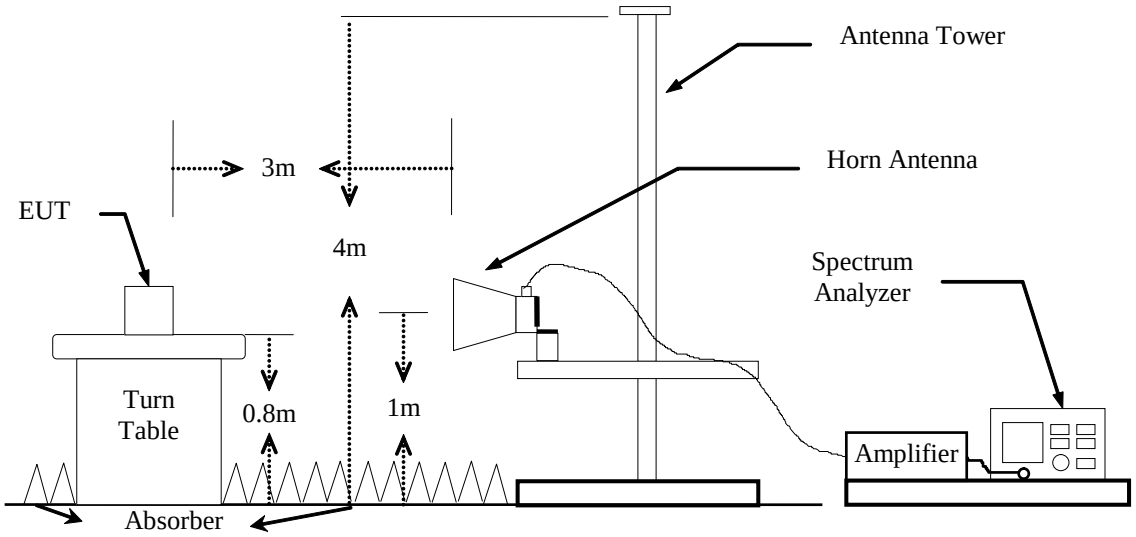
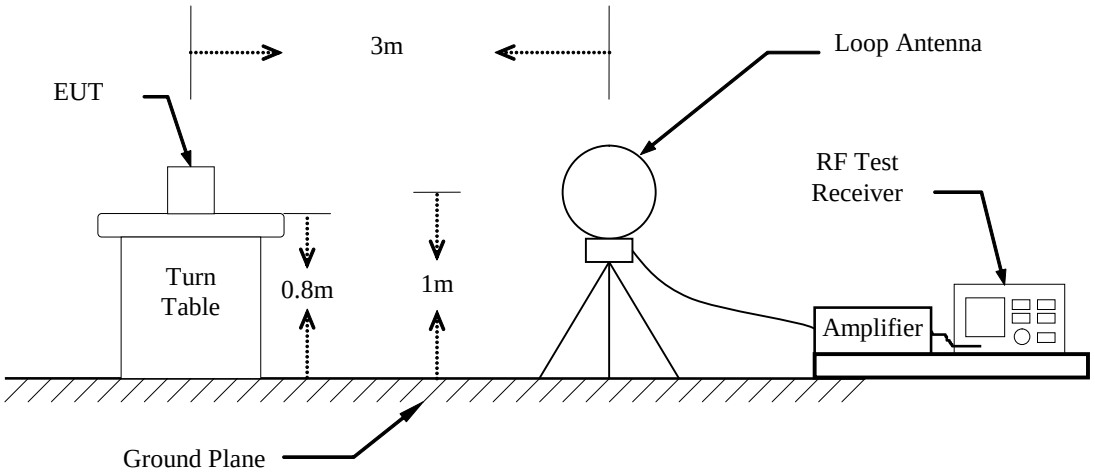


Figure 6: Frequencies measured 9 KHz to 30 MHz configuration



10.3 Measuring Instrument

The following instrument are used for radiated emissions measurement :

Equipment	Trade Name	Model No.
EMI Receiver	R&S	ESCI
Spectrum Analyzer	R&S	FSU46
Spectrum Analyzer	R&S	FSV40
Horn Antenna	EMCO	3117
Horn Antenna	EMCO	3116
Loop Antenna	ETS-LINDREN	6512
PRE-Amplifier	Agilent	8449B
PRE-Amplifier	Agilent	8447D
BiLog Antenna	ETC	MCTD 2786
Trilog Broadband Antenna with 5dB Pad	SCHWARZBECK&EMCI	VULB 9168 & EMCI-N-6-05
Spectrum Analyzer	KEYSIGHT	N9030B

Software: LZ-RF (Ver. ETC-3A2)

Measuring instrument setup in measured frequency band when specified detector function is used:

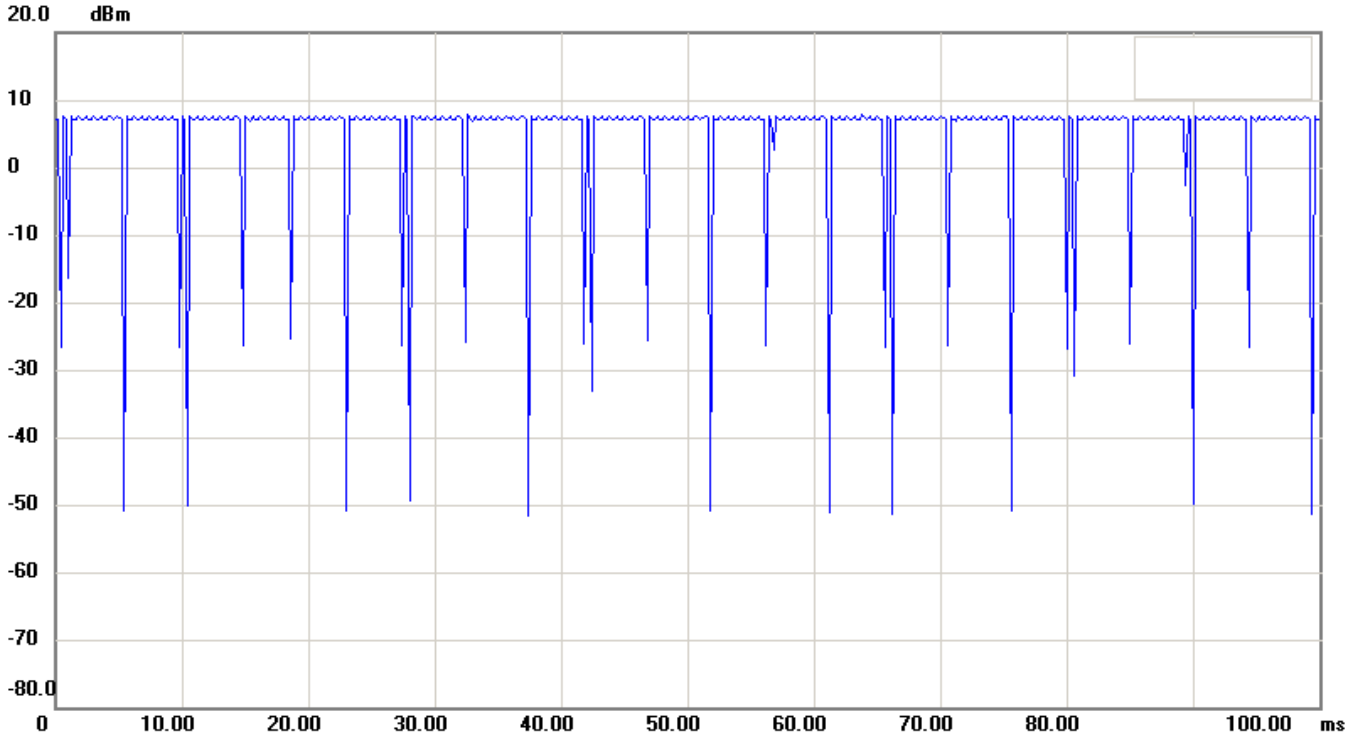
Frequency Band (MHz)	Instrument	Function	Resolution Bandwidth	Video Bandwidth
0.009 to 30	RF Test Receiver	Quasi-Peak	9 kHz	30 kHz
	RF Test Receiver	Average	9 kHz	30 kHz
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	300 kHz
	Spectrum Analyzer	Peak	120 kHz	300 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	VBW_avg (Note)

Note:For average measurement

Condition	VBW_avg
Duty cycle is no less than 98 percent	10 Hz
Duty cycle is less than 98 percent, T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation	$\geq \frac{1}{T}$
Current use	10Hz

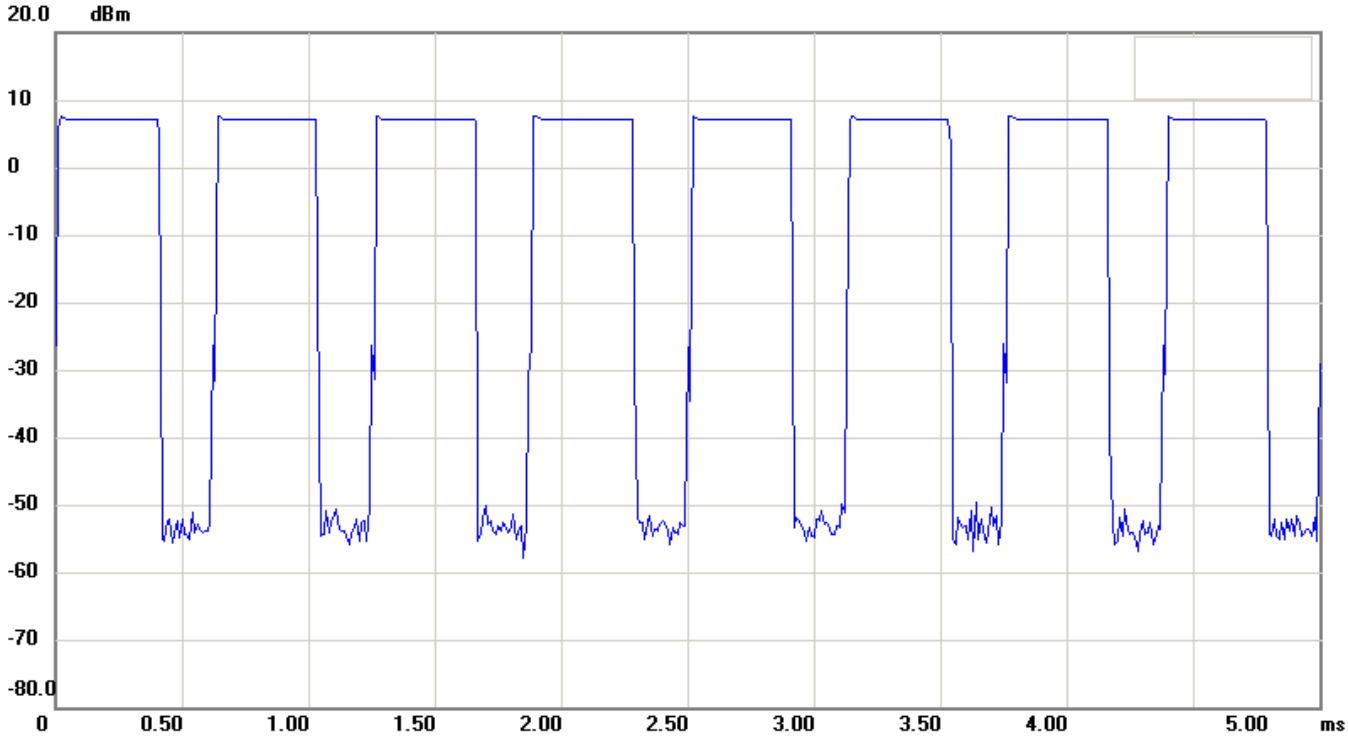
Duty cycle

File:	**21-05-MAW-007_BLE**	**#15**	**Date:**	**2021/8/4**	**Temperature:**	**24 ℃**
Site:	**RF-Cond01**				**Humidity:**	**50 %**



Condition:		**RF Conducted**	
EUT:	**Rapid Test Reader**	**Sweep Time: 100ms**	**Att.: 20dB**
Model:	**CHR-631**	**RBW: 1000 KHz**	**VBW: 1000 KHz**
Test Mode:	**BLE**	**Operator:**	**Phillip**
Note:	**FCC_BLE Duty Cycle-1**		

File:	**21-05-MAW-007_BLE**	**#16**	**Date:**	**2021/8/4**	**Temperature:**	**24 ℃**
Site:	**RF-Cond01**				**Humidity:**	**50 %**



Condition:		**RF Conducted**	
EUT:	**Rapid Test Reader**	**Sweep Time: 5ms**	**Att.: 20dB**
Model:	**CHR-631**	**RBW: 1000 KHz**	**VBW: 1000 KHz**
Test Mode:	**BLE**	**Operator:**	**Phillip**
Note:	**FCC_BLE Duty Cycle-2 (Duty = 69.8%)**		

10.4 Radiated Emission Data

10.4.1 Harmonic

10.4.1.1 Operation Mode: Tx

Test Date: Dec. 07, 2021 Temperature: 23℃ Humidity : 60%

a) Channel Low

Fundamental Frequency: 2402 MHz

Frequency	Ant Pol	Reading (dBuV/m)@3m		Correct Factor	Result (dBuV/m)@3m		Limit (dBuV/m)@3m		Margin (worse)
(MHz)	H/V	Peak	AVG	(dB)	Peak	AVG	Peak	AVG	(dB)
4804.0000	H	---	---	1.08	---	---	74.0	54.0	---
4804.0000	V	---	---	1.08	---	---	74.0	54.0	---
7206.0000	H	---	---	3.30	---	---	74.0	54.0	---
7206.0000	V	---	---	3.30	---	---	74.0	54.0	---
9608.0000	H	---	---	4.28	---	---	74.0	54.0	---
9608.0000	V	---	---	4.28	---	---	74.0	54.0	---
12010.0000	H	---	---	7.22	---	---	74.0	54.0	---
12010.0000	V	---	---	7.22	---	---	74.0	54.0	---
14412.0000	H	---	---	9.98	---	---	74.0	54.0	---
14412.0000	V	---	---	9.98	---	---	74.0	54.0	---

Note : 1. Remark "---" means that the emissions level is too low to be measured.
2. If the peak result is under the average limit, that is deemed to meet the average limit.
3. The estimated measurement uncertainty of the result measurement is
VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)
VER: ±4.71dB(6GHz≦f<18GHz) ;HOR: ±4.96dB(6GHz≦f<18GHz)
VER: ±5.37dB(18GHz≦f≦40GHz) ;HOR: ±5.61dB(18GHz≦f≦40GHz)

b) Channel Mid

Fundamental Frequency: 2440 MHz

Frequency	Ant Pol	Reading (dBuV/m)@3m		Correct Factor	Result (dBuV/m)@3m		Limit (dBuV/m)@3m		Margin (worse)
(MHz)	H/V	Peak	AVG	(dB)	Peak	AVG	Peak	AVG	(dB)
4880.0000	H	---	---	1.34	---	---	74.0	54.0	---
4880.0000	V	---	---	1.34	---	---	74.0	54.0	---
7320.0000	H	---	---	3.38	---	---	74.0	54.0	---
7320.0000	V	---	---	3.38	---	---	74.0	54.0	---
9760.0000	H	---	---	4.45	---	---	74.0	54.0	---
9760.0000	V	---	---	4.45	---	---	74.0	54.0	---
12200.0000	H	---	---	7.58	---	---	74.0	54.0	---
12200.0000	V	---	---	7.58	---	---	74.0	54.0	---
14640.0000	H	---	---	10.04	---	---	74.0	54.0	---
14640.0000	V	---	---	10.04	---	---	74.0	54.0	---

Note : 1. Remark “---” means that the emissions level is too low to be measured.
2. If the peak result is under the average limit, that is deemed to meet the average limit.
3. The estimated measurement uncertainty of the result measurement is
VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)
VER: ±4.71dB(6GHz≦f<18GHz) ;HOR: ±4.96dB(6GHz≦f<18GHz)
VER: ±5.37dB(18GHz≦f≦40GHz) ;HOR: ±5.61dB(18GHz≦f≦40GHz)

c) Channel High

Fundamental Frequency: 2480 MHz

Frequency	Ant Pol	Reading (dBuV/m)@3m		Correct Factor	Result (dBuV/m)@3m		Limit (dBuV/m)@3m		Margin (worse)
(MHz)	H/V	Peak	AVG	(dB)	Peak	AVG	Peak	AVG	(dB)
4960.0000	H	---	---	1.62	---	---	74.0	54.0	---
4960.0000	V	---	---	1.62	---	---	74.0	54.0	---
7440.0000	H	---	---	3.47	---	---	74.0	54.0	---
7440.0000	V	---	---	3.47	---	---	74.0	54.0	---
9920.0000	H	---	---	4.65	---	---	74.0	54.0	---
9920.0000	V	---	---	4.65	---	---	74.0	54.0	---
12400.0000	H	---	---	7.94	---	---	74.0	54.0	---
12400.0000	V	---	---	7.94	---	---	74.0	54.0	---
14880.0000	H	---	---	10.14	---	---	74.0	54.0	---
14880.0000	V	---	---	10.14	---	---	74.0	54.0	---

Note : 1. Remark "---" means that the emissions level is too low to be measured.
2. If the peak result is under the average limit, that is deemed to meet the average limit.
3. The estimated measurement uncertainty of the result measurement is
VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)
VER: ±4.71dB(6GHz≦f<18GHz) ;HOR: ±4.96dB(6GHz≦f<18GHz)
VER: ±5.37dB(18GHz≦f≦40GHz) ;HOR: ±5.61dB(18GHz≦f≦40GHz)

10.4.3 Spurious Emission

10.4.3.1 Above 1GHz test charts for Harmonic and spurious emission

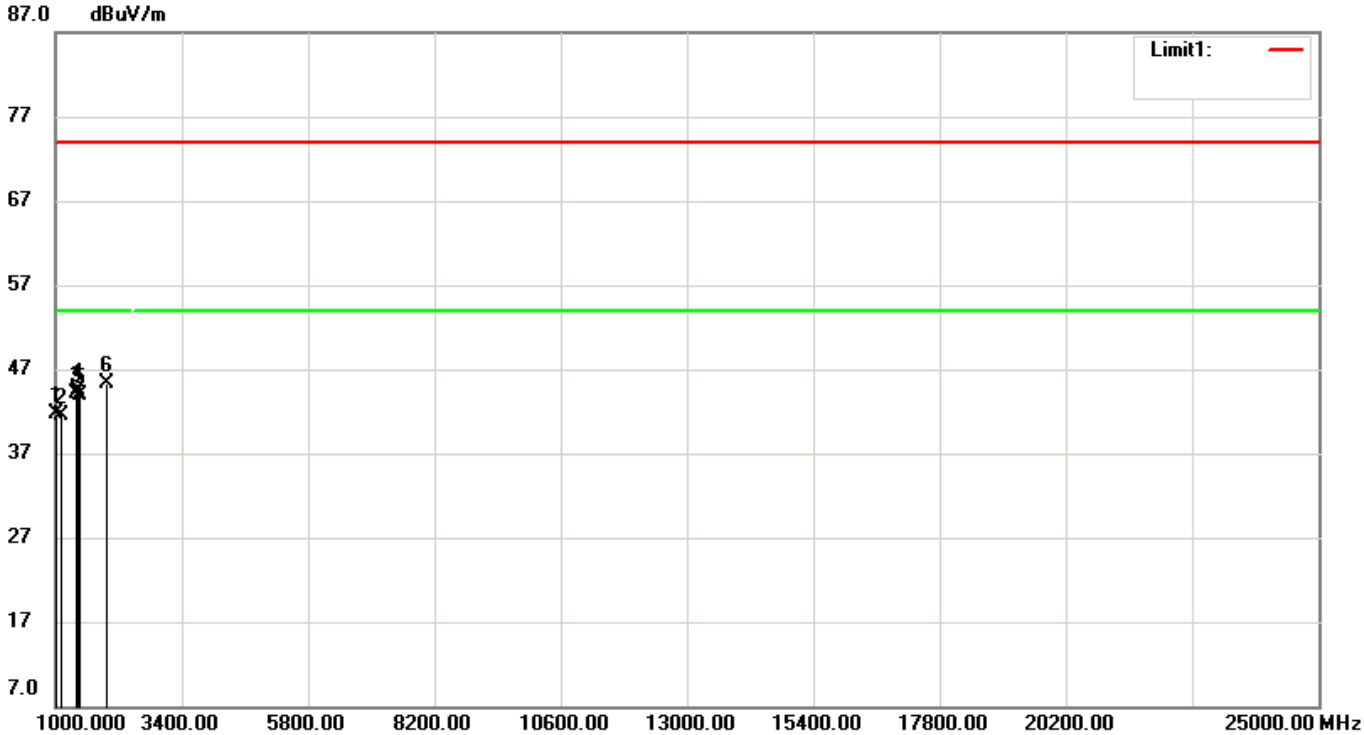
A. Channel Low

Operation Mode : TX/RX

Fundamental Frequency : 2402 MHz

File: 21-05-MAW-007_BLE **#35** **Date:** 2021/12/7 **Temperature:** 23 ℃

Site: RE02-EMC B1-N2 **Humidity:** 60 %



Condition: FCC Part15 RE-Class B_Above 1GHz_PK **Polarization:** Horizontal
EUT: 手持式 IVD 醫療器材 **Distance:** 3m
Model: CHR-631
Test Mode: BLE **Operator:** Phillip
Note: CH LOW-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	1000.0000	51.22	peak	-9.47	41.75	74.00	-32.25	151	23
2	1089.74350	50.72	peak	-9.19	41.53	74.00	-32.47	152	169
3	1372.43580	52.47	peak	-8.30	44.17	74.00	-29.83	135	177
4	1421.79470	52.63	peak	-8.15	44.48	74.00	-29.52	133	183
5	1441.98710	52.03	peak	-8.08	43.95	74.00	-30.05	152	180
6	1955.76920	49.62	peak	-4.27	45.35	74.00	-28.65	144	269

Note: 1. If the peak result is under the average limit, that is deemed to meet the average limit.

2. The estimated measurement uncertainty of the result measurement is:

VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)

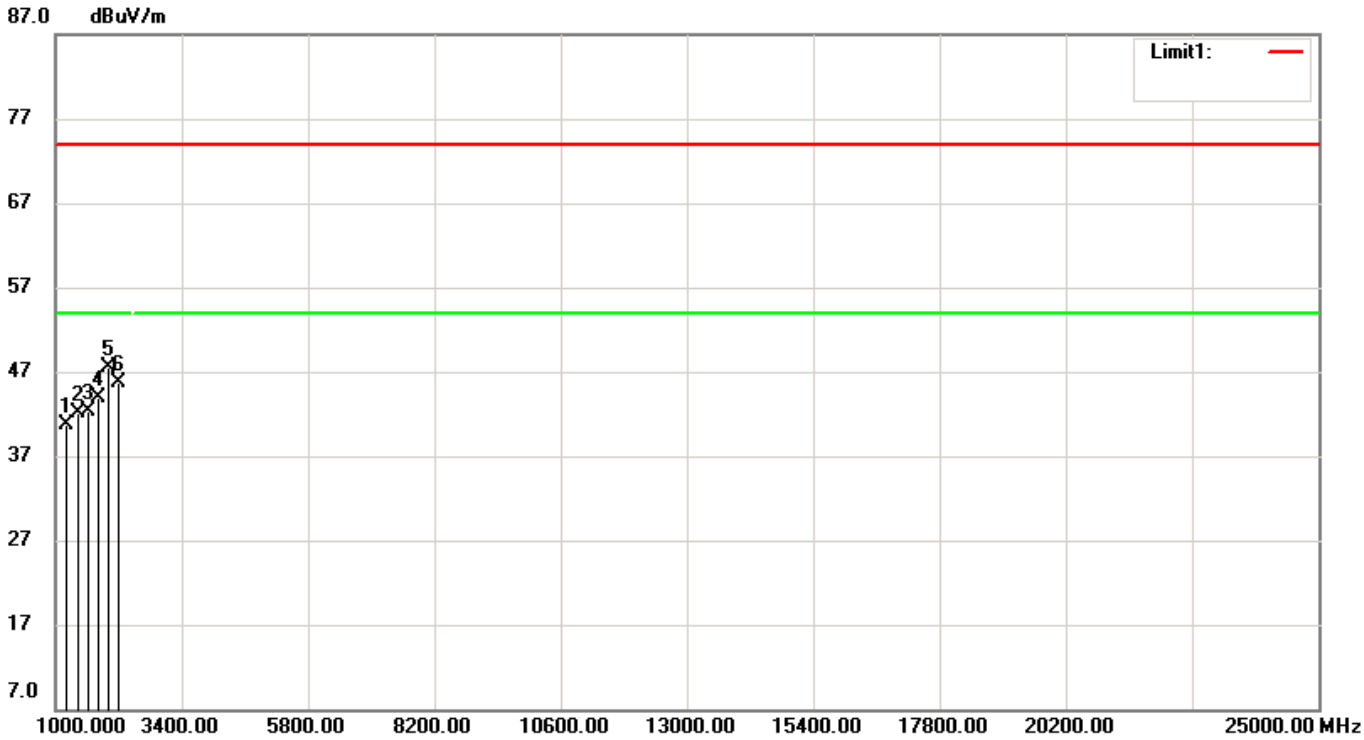
VER: ±4.71dB(6GHz≦f<18GHz) ;HOR: ±4.96dB(6GHz≦f<18GHz)

VER: ±5.37dB(18GHz≦f≦40GHz) ;HOR: ±5.61dB(18GHz≦f≦40GHz)

Operation Mode : TX/RX
Fundamental Frequency : 2402 MHz

File: **21-05-MAW-007_BLE** **#36** **Date:** **2021/12/7** **Temperature:** **23 ℃**

Site: **RE02-EMC B1-N2** **Humidity:** **60 %**



Condition: **FCC Part15 RE-Class B_Above 1GHz_PK** **Polarization:** **Vertical**

EUT: **手持式 IVD 醫療器材** **Distance:** **3m**

Model: **CHR-631**

Test Mode: **BLE** **Operator:** **Phillip**

Note: **CH LOW-1**

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	1168.26920	49.57	peak	-8.95	40.62	74.00	-33.38	145	167
2	1397.11530	50.24	peak	-8.22	42.02	74.00	-31.98	158	68
3	1585.57700	49.48	peak	-7.21	42.27	74.00	-31.73	158	282
4	1794.23070	49.41	peak	-5.56	43.85	74.00	-30.15	152	193
5	1991.66660	51.50	peak	-3.99	47.51	74.00	-26.49	171	111
6	2189.10250	49.11	peak	-3.43	45.68	74.00	-28.32	151	23

Note: 1. If the peak result is under the average limit, that is deemed to meet the average limit.
2. The estimated measurement uncertainty of the result measurement is:
VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)
VER: ±4.71dB(6GHz≦f<18GHz) ;HOR: ±4.96dB(6GHz≦f<18GHz)
VER: ±5.37dB(18GHz≦f≦40GHz) ;HOR: ±5.61dB(18GHz≦f≦40GHz)

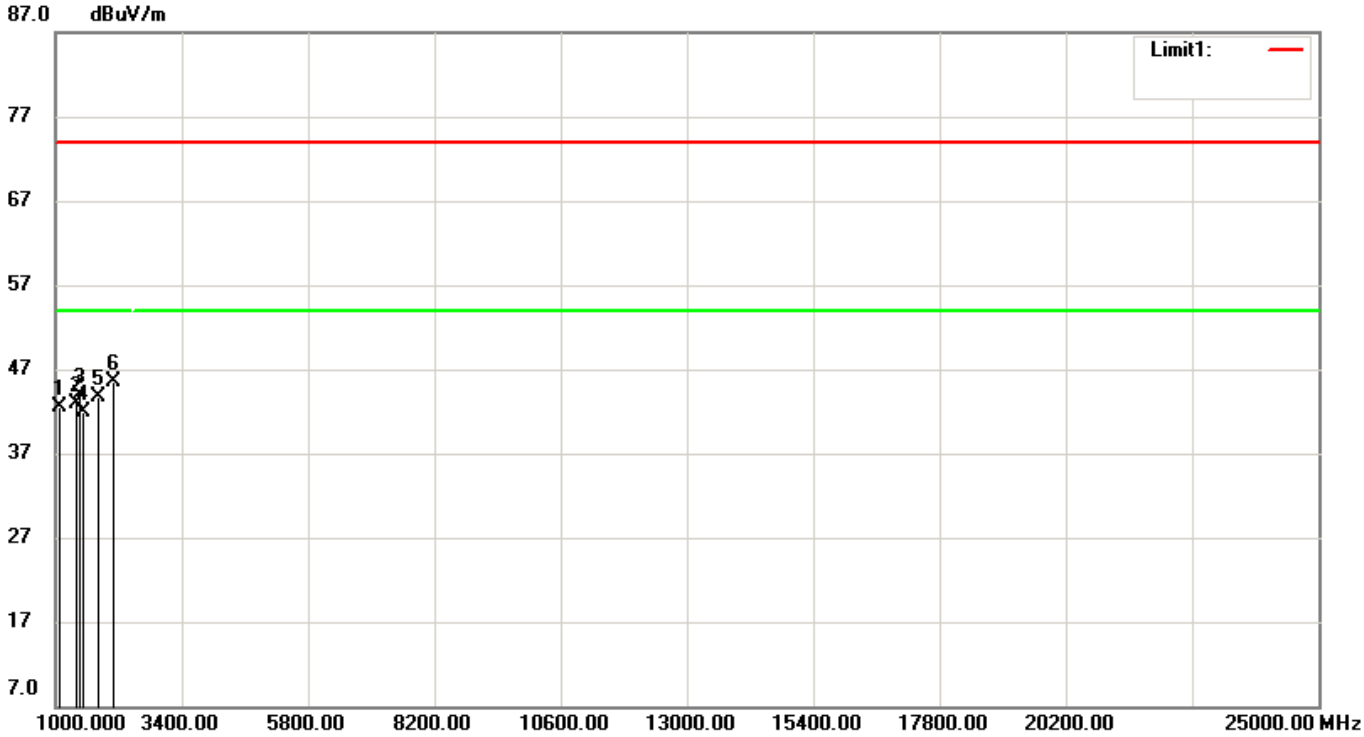
B. Channel Mid

Operation Mode : TX/RX

Fundamental Frequency : 2440 MHz

File: **21-05-MAW-007_BLE** **#37** **Date:** **2021/12/7** **Temperature:** **23 ℃**

Site: **RE02-EMC B1-N2** **Humidity:** **60 %**



Condition: **FCC Part15 RE-Class B_Above 1GHz_PK** **Polarization:** **Horizontal**

EUT: **手持式 IVD 醫療器材** **Distance:** **3m**

Model: **CHR-631**

Test Mode: **BLE** **Operator:** **Phillip**

Note: **CH MID-1**

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	1049.35900	51.80	peak	-9.31	42.49	74.00	-31.51	150	271
2	1367.94870	51.16	peak	-8.32	42.84	74.00	-31.16	150	176
3	1435.25640	52.01	peak	-8.10	43.91	74.00	-30.09	143	221
4	1502.56410	49.87	peak	-7.88	41.99	74.00	-32.01	150	316
5	1796.47430	49.21	peak	-5.54	43.67	74.00	-30.33	150	67
6	2083.65380	49.15	peak	-3.70	45.45	74.00	-28.55	161	99

Note: 1. If the peak result is under the average limit, that is deemed to meet the average limit.

2. The estimated measurement uncertainty of the result measurement is:

VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)

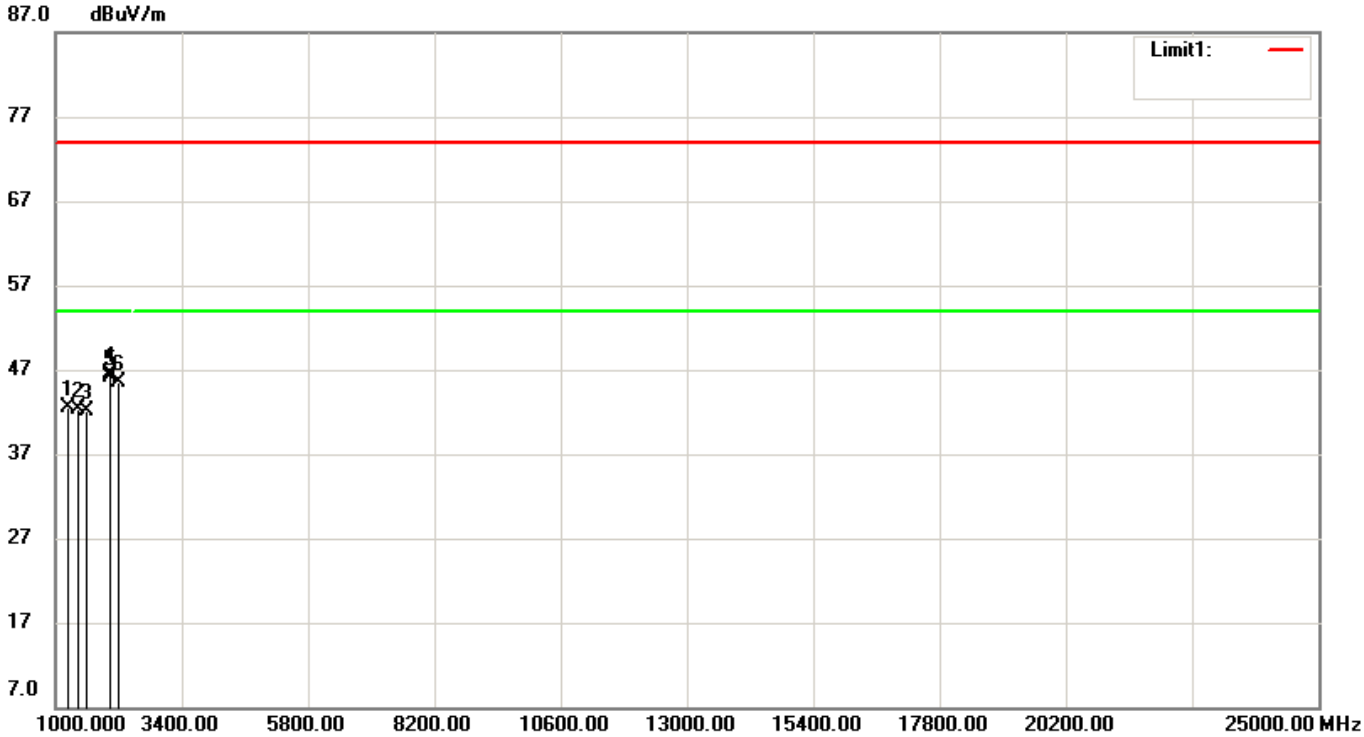
VER: ±4.71dB(6GHz≦f<18GHz) ;HOR: ±4.96dB(6GHz≦f<18GHz)

VER: ±5.37dB(18GHz≦f≦40GHz) ;HOR: ±5.61dB(18GHz≦f≦40GHz)

Operation Mode : TX/RX
Fundamental Frequency : 2440 MHz

File: **21-05-MAW-007_BLE** **#38** **Date:** **2021/12/7** **Temperature:** **23 ℃**

Site: **RE02-EMC B1-N2** **Humidity:** **60 %**



Condition: **FCC Part15 RE-Class B_Above 1GHz_PK** **Polarization:** **Vertical**

EUT: **手持式 IVD 醫療器材** **Distance:** **3m**

Model: **CHR-631**

Test Mode: **BLE** **Operator:** **Phillip**

Note: **CH MID-1**

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	1195.19230	51.36	peak	-8.85	42.51	74.00	-31.49	201	289
2	1397.11530	50.50	peak	-8.22	42.28	74.00	-31.72	151	143
3	1547.43580	49.66	peak	-7.53	42.13	74.00	-31.87	157	341
4	2000.64100	50.38	peak	-3.92	46.46	74.00	-27.54	182	23
5	2025.32050	50.05	peak	-3.85	46.20	74.00	-27.80	122	134
6	2177.88460	48.91	peak	-3.46	45.45	74.00	-28.55	150	156

Note: 1. If the peak result is under the average limit, that is deemed to meet the average limit.

2. The estimated measurement uncertainty of the result measurement is:

VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)

VER: ±4.71dB(6GHz≦f<18GHz) ;HOR: ±4.96dB(6GHz≦f<18GHz)

VER: ±5.37dB(18GHz≦f≦40GHz) ;HOR: ±5.61dB(18GHz≦f≦40GHz)

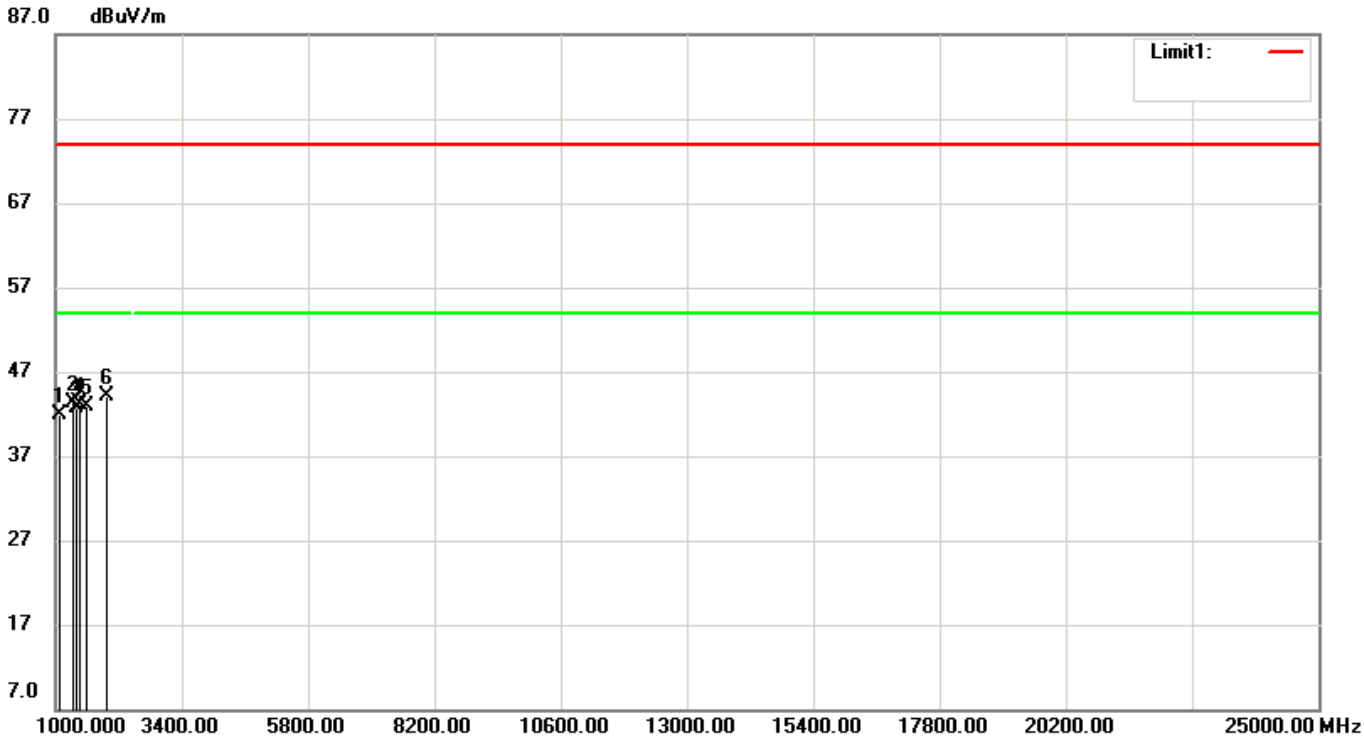
C. Channel High

Operation Mode : TX/RX

Fundamental Frequency : 2480 MHz

File: **21-05-MAW-007_BLE** **#39** **Date:** **2021/12/7** **Temperature:** **23 ℃**

Site: **RE02-EMC B1-N2** **Humidity:** **60 %**



Condition: **FCC Part15 RE-Class B_Above 1GHz_PK** **Polarization:** **Horizontal**

EUT: **手持式 IVD 醫療器材** **Distance:** **3m**

Model: **CHR-631**

Test Mode: **BLE** **Operator:** **Phillip**

Note: **CH HIGH-1**

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	1040.38460	51.30	peak	-9.35	41.95	74.00	-32.05	161	329
2	1318.58970	51.80	peak	-8.48	43.32	74.00	-30.68	141	124
3	1372.43580	51.08	peak	-8.30	42.78	74.00	-31.22	149	65
4	1426.28200	51.23	peak	-8.13	43.10	74.00	-30.90	150	77
5	1567.62820	50.32	peak	-7.36	42.96	74.00	-31.04	150	12
6	1931.08970	48.59	peak	-4.47	44.12	74.00	-29.88	150	158

Note: 1. If the peak result is under the average limit, that is deemed to meet the average limit.

2. The estimated measurement uncertainty of the result measurement is:

VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)

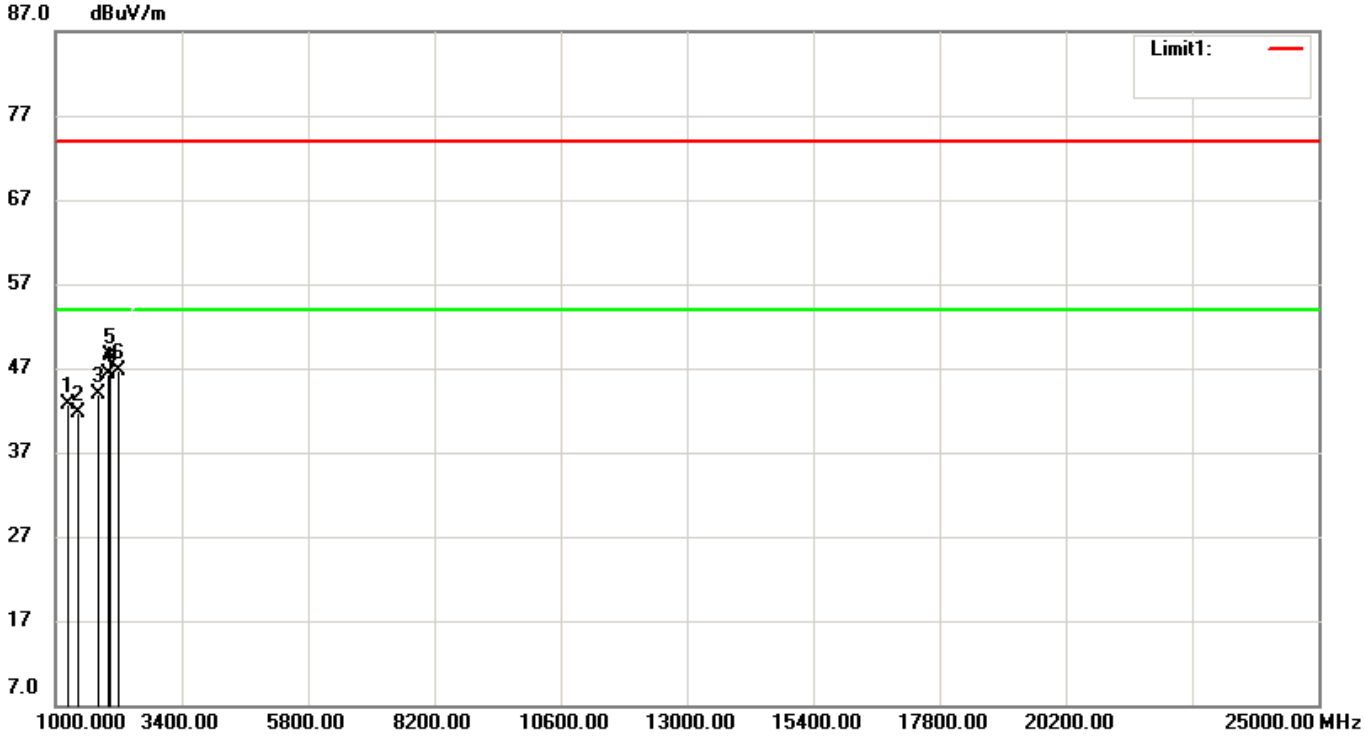
VER: ±4.71dB(6GHz≦f<18GHz) ;HOR: ±4.96dB(6GHz≦f<18GHz)

VER: ±5.37dB(18GHz≦f≦40GHz) ;HOR: ±5.61dB(18GHz≦f≦40GHz)

Operation Mode : TX/RX
Fundamental Frequency : 2480 MHz

File: 21-05-MAW-007_BLE **#40** **Date:** 2021/12/7 **Temperature:** 23 ℃

Site: RE02-EMC B1-N2 **Humidity:** 60 %



Condition: FCC Part15 RE-Class B_Above 1GHz_PK **Polarization:** Vertical

EUT: 手持式 IVD 醫療器材 **Distance:** 3m

Model: CHR-631

Test Mode: BLE **Operator:** Phillip

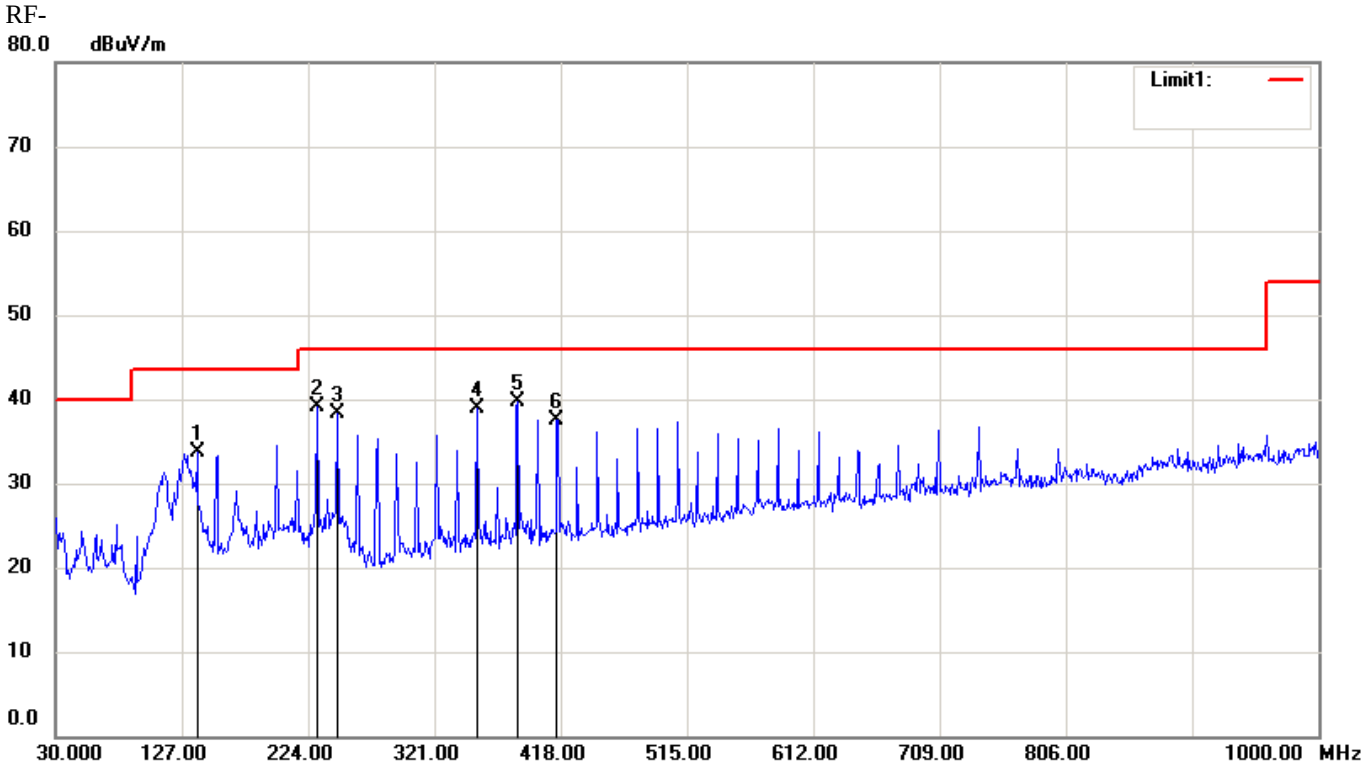
Note: CH HIGH-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	1197.43580	51.57	peak	-8.85	42.72	74.00	-31.28	151	44
2	1399.35900	49.87	peak	-8.22	41.65	74.00	-32.35	170	151
3	1800.96150	49.48	peak	-5.51	43.97	74.00	-30.03	142	171
4	1971.47430	50.51	peak	-4.15	46.36	74.00	-27.64	162	41
5	2000.64100	52.33	peak	-3.92	48.41	74.00	-25.59	157	231
6	2182.37170	50.07	peak	-3.45	46.62	74.00	-27.38	132	145

Note: 1. If the peak result is under the average limit, that is deemed to meet the average limit.
2. The estimated measurement uncertainty of the result measurement is:
VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)
VER: ±4.71dB(6GHz≦f<18GHz) ;HOR: ±4.96dB(6GHz≦f<18GHz)
VER: ±5.37dB(18GHz≦f≦40GHz) ;HOR: ±5.61dB(18GHz≦f≦40GHz)

10.4.3.2 Other Emission

10.4.3.2.1 30MHz to 1GHz

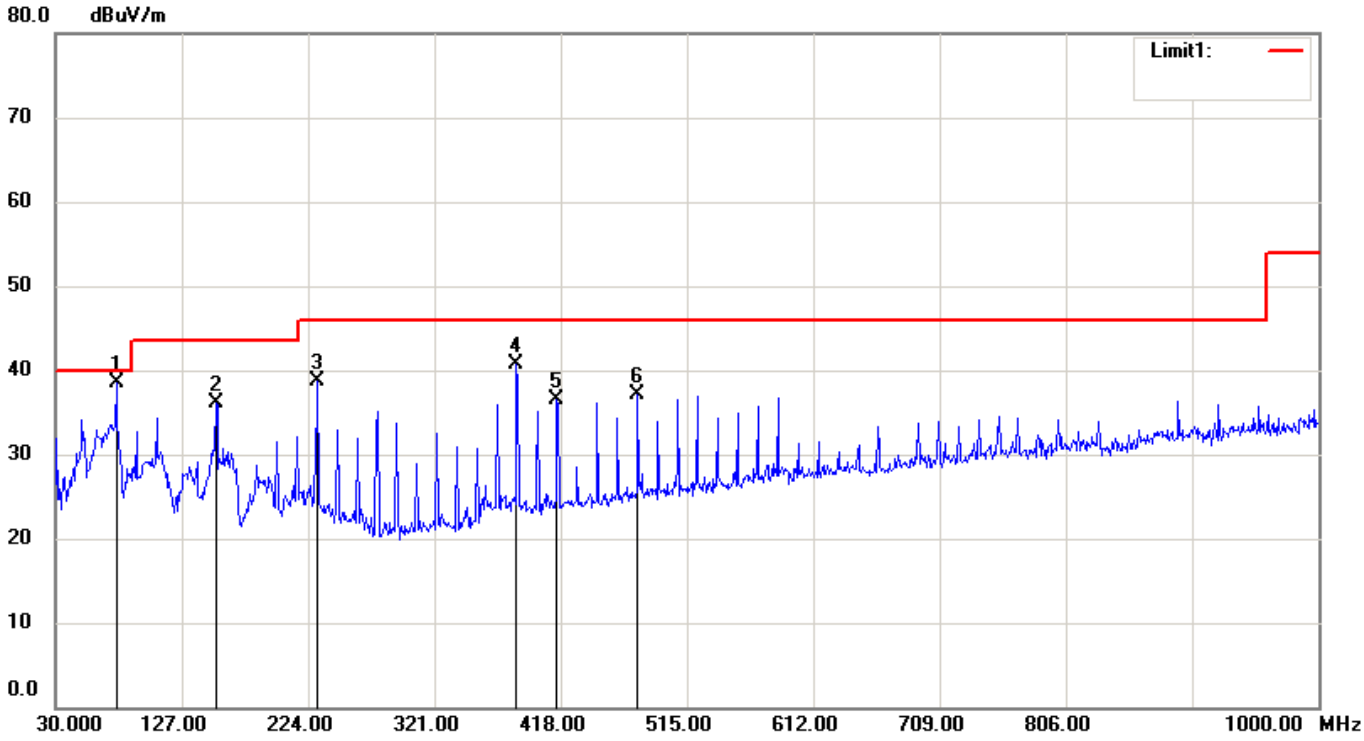


Condition:	**FCC Part15 RE-Class B_30-1000MHz**	**Polarization:**	**Horizontal**
EUT:	**手持式 IVD 醫療器材**	**Distance:**	**3m**
Model:	**CHR-631**		
Test Mode:	**BLE**	**Operator:**	**Phillip**

Note:

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	138.6400	41.36	QP	-7.67	33.69	43.50	-9.81	100	62
2	230.7900	47.30	QP	-8.19	39.11	46.00	-6.89	121	150
3	246.3100	45.69	QP	-7.38	38.31	46.00	-7.69	112	144
4	353.9800	43.24	QP	-4.37	38.87	46.00	-7.13	150	239
5	385.0200	43.57	QP	-3.80	39.77	46.00	-6.23	146	87
6	415.0900	40.71	QP	-3.17	37.54	46.00	-8.46	100	122

File:	**21-05-MAW-007_Below 1G**	**#8**	**Date:**	**2021/12/6**	**Temperature:**	**22 ℃**
Site:	**RE02-EMC B1-N2**				**Humidity:**	**59 %**



Condition:	**FCC Part15 RE-Class B_30-1000MHz**	**Polarization:**	**Vertical**
EUT:	**手持式 IVD 醫療器材**	**Distance:**	**3m**
Model:	**CHR-631**		
Test Mode:	**BLE**	**Operator:**	**Phillip**
Note:			

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)
1	76.5600	49.74	QP	-11.16	38.58	40.00	-1.42	100	17
2	153.1900	43.06	QP	-6.94	36.12	43.50	-7.38	121	129
3	230.7900	46.81	QP	-8.19	38.62	46.00	-7.38	150	67
4	384.0500	44.47	QP	-3.82	40.65	46.00	-5.35	150	40
5	415.0900	39.71	QP	-3.17	36.54	46.00	-9.46	135	287
6	477.1700	39.08	QP	-2.06	37.02	46.00	-8.98	152	94

10.4.3.2.2 below 30MHz

Frequency (MHz)	Reading (dBuV/m) Peak	Duty (dB)	Factor (dB)	Result @3m (dBuV/m) Peak	QP	AVG	Limit @3m (dBuV/m) Peak	AVG
Radiated emission frequencies from 9 kHz to 30 MHz were too low to be measured.								

Note: 1. Place of Measurement: Measuring site of the ETC.
2. Item of margin shown in above table refer to average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. If the peak result is under the average limit, that is deemed to meet the average limit.
5. If there is only peak result, item "Margin" referred to "peak result – average limit".
6. The radiation emissions have been measured to beyond the tenth harmonic of the fundamental frequency and show the significant frequencies, other means the value is too low to be detected.
7. The estimated measurement uncertainty of the result measurement is
±4.2dB (9kHz≦f≦30MHz)
±4.6dB (30MHz≦f<300MHz).
±4.4dB (300MHz≦f<1000MHz).
±2.9dB (1GHz≦f<18GHz).
±3.5dB (18GHz≦f≦40GHz).

10.4.4 Radiated Measurement at Bandedge with Fundamental Frequencies

Operation Mode: Tx

Test Date: Dec. 07, 2021 Temperature : 23℃ Humidity : 60%

Frequency	Reading @3m (dBuV/m)				Factor	Result		Limit @3m		Margin (worse)	
	H		V			(dBuV/m)		(dBuV/m)		(dB)	
(MHz)	Peak	Ave	Peak	Ave	(dB)	Peak	Ave	Peak	Ave	Peak	Ave
2390.000	27.41	14.00	28.25	14.01	34.44	62.69	48.45	74.00	54.00	-11.31	-5.55
2483.500	28.18	14.40	28.22	14.19	34.66	62.88	49.06	74.00	54.00	-11.12	-4.94

Electric field strength (dBuV/m)	CH L	CH M	CH Hi
	100.83	101.27	102.82

Note:1. The result is the highest value of radiated emission from restrict band of 2310~2390 MHz.
2. The estimated measurement uncertainty of the result measurement is:
VER: ±5.32dB(1GHz≦f<6GHz) ;HOR: ±5.05dB(1GHz≦f<6GHz)

10.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

where

Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Amplifier Gain

11. EQUIPMENTS LIST FOR TESTING

Equipment	Manufacturer	Model No.	S/N	Calibration Date	Next Cal. Due
EMI Test Receiver	R&S	ESCI	13054418-001	11/05/2021	11/04/2022
V-LISN	R&S	ENV216	13057719-001	05/13/2021	05/12/2022
Spectrum Analyzer	R&S	FSV40	13052017-001	05/27/2021	05/26/2022
Attenuator	WEINSCHEL	56-10	58772	05/03/2021	05/02/2022
Power Meter	Agilent	N1912A	13050625-001	10/13/2021	10/12/2022
Power Sensor	Agilent	N1922A	13053523-001	10/13/2021	10/12/2022
EMI Receiver	R&S	ESCI	13054423-001	11/24/2021	11/23/2022
Spectrum Analyzer	R&S	FSU46	13040904-001	05/13/2021	05/12/2022
Horn Antenna	EMCO	3117	13059211-004	04/09/2021	04/08/2022
Horn Antenna	EMCO	3116	13059202-001	11/04/2021	11/03/2022
Loop Antenna	ETS-LINDREN	6512	13054106-001	06/15/2021	06/14/2022
PRE-Amplifier	Agilent	8449B	13040709-001	12/01/2021	11/30/2022
PRE-Amplifier	Agilent	8447D	13040715-002	05/03/2021	05/02/2022
BiLog Antenna	ETC	MCTD 2786	BL19J04024	03/11/2021	03/10/2022
Trilog Broadband Antenna with 5dB Pad	SCHWARZBECK&EMCI	VULB 9168 & EMCI-N-6-05	1211&AT-N0569	05/10/2021	05/09/2022