

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 22
47 CFR FCC Part 24
47 CFR FCC Part 27
47 CFR FCC Part 2

Report No.: RFBDWM-WTW-P24050507A-2

FCC ID: 2AUWW-HALOWA2

Product: Halo Collar 5

Brand: Halo

Model No.: Halo 5

Received Date: 2025/6/12

Test Date: 2025/6/25

Issued Date: 2025/7/18

Applicant: Protect Animals with Satellites, LLC

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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FCC Registration / (1) 788550 / TW0003

Designation Number: (2) 281270 / TW0032

Approved by:

Jeremy Lin

Date:

2025/7/18

Jeremy Lin / Project Engineer

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Prepared by : Vera Huang / Specialist



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Release Control Record

Issue No.	Description	Date Issued
RFBDWM-WTW-P24050507A-2	Original Release	2025/7/18

1 Certificate

Product: Halo Collar 5

Brand: Halo

Test Model: Halo 5

Sample Status: Engineering sample

Applicant: Protect Animals with Satellites, LLC

Test Date: 2025/6/25

Standard: 47 CFR FCC Part 22
47 CFR FCC Part 24
47 CFR FCC Part 27
47 CFR FCC Part 2

Measurement ANSI/TIA/EIA-603-E 2016

procedure: ANSI C63.26-2015

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 971168 D02 Misc Rev Approv License Devices v02r02

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 22 47 CFR FCC Part 24 47 CFR FCC Part 27 47 CFR FCC Part 2			
Standard / Clause	Test Item	Result	Remark
FCC 47 CFR Part 2.1046 FCC 47 CFR Part 22.913 (a) FCC 47 CFR Part 24.232 (c) FCC 47 CFR Part 27.50(d) FCC 47 CFR Part 27.50(c) FCC 47 CFR Part 27.50(b)	Effective Radiated Power and Equivalent Isotropically Radiated Power	N/A	Refer to Note
FCC 47 CFR Part 2.1047	Modulation Characteristics	N/A	Refer to Note
FCC 47 CFR Part 22.913 (d) FCC 47 CFR Part 24.232 (d) FCC 47 CFR Part 27.50(d)	Peak to Average Ratio	N/A	Refer to Note
FCC 47 CFR Part 2.1049	Bandwidth	N/A	Refer to Note
FCC 47 CFR Part 2.1051 FCC 47 CFR Part 22.917 FCC 47 CFR Part 24.238 FCC 47 CFR Part 27.53(h) FCC 47 CFR Part 27.53(g) FCC 47 CFR Part 27.53(c)(f)	Conducted Spurious Emissions	N/A	Refer to Note
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 22.917 FCC 47 CFR Part 24.238 FCC 47 CFR Part 27.53(h) FCC 47 CFR Part 27.53(g) FCC 47 CFR Part 27.53(c)(f)	Radiated Spurious Emissions below 1GHz	Pass	Minimum passing margin is -46.20 dB at 129.91 MHz

47 CFR FCC Part 22
 47 CFR FCC Part 24
 47 CFR FCC Part 27
 47 CFR FCC Part 2

Standard / Clause	Test Item	Result	Remark
FCC 47 CFR Part 2.1053 FCC 47 CFR Part 22.917 FCC 47 CFR Part 24.238 FCC 47 CFR Part 27.53(h) FCC 47 CFR Part 27.53(g) FCC 47 CFR Part 27.53(c)(f)	Radiated Spurious Emissions above 1GHz	N/A	Refer to Note
FCC 47 CFR Part 2.1055 FCC 47 CFR Part 22.355 FCC 47 CFR Part 24.235 FCC 47 CFR Part 27.54	Frequency Stability	N/A	Refer to Note

Note:

1. Only test item of radiated spurious emissions below 1GHz was performed for this report. Others testing data please refer to original report.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 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	Specification	Expanded Uncertainty (k=2) (±)
Radiated Spurious Emissions below 1GHz	9 kHz ~ 30 MHz	3 dB
	30 MHz ~ 1 GHz	2.93 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Halo Collar 5
Brand	Halo
Test Model	Halo 5
Status of EUT	Engineering sample
Power Supply Rating	5 Vdc from adapter

Note:

- This report is issued as a supplementary report of BV CPS report no.: RFBDWM-WTW-P24050507-2. The difference compared to the original report is listed as below. Therefore, only test item of radiated spurious emissions below 1GHz was verified and recorded in this report. Others testing data please refer to original report.
 - Change the model name to Halo 5
 - Change the product name to Halo Collar 5
 - Remove logo LED FPC
 - Increase charging speed via software

- The following modules can be configured in the EUT.

Item	Brand	Model	Specification
WWAN module	Quectel	BG770A-GL	Cat-M1
BT + WiFi module	Silicon labs	RS9116W	b/g/n+BT LE
BT module	Nordic	NRF52840	BT LE

- The EUT uses following accessories.

Charging dock	Brand	VSO
	Model	N-841-079-05000002
Type C cable	Brand	VSO
	Model	N801-000-00025635
	Signal Line	1.2M with shielding

- WWAN, WLAN, BT function cannot transmission at the same time.
- The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

- The antenna information is listed as below.

RF Chain No.	Frequency Band	Antenna Net Gain (dBi)	Antenna Type	Connector Type
LTE0	Cat-M1 Band 2	-8.5	PCB	pogo pin
LTE1	Cat-M1 Band 4	-7.6	PCB	pogo pin
LTE2	Cat-M1 Band 5	-8.8	PCB	pogo pin
LTE3	Cat-M1 Band 12	-5.2	PCB	pogo pin
LTE4	Cat-M1 Band 13	-4.6	PCB	pogo pin

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition.
Worst Case:	Y-axis

For Cat-M1 Band 2

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
Radiated Spurious Emissions below 1GHz	19193 (1909.30 MHz)	1.4 MHz	16QAM	1 RB

For Cat-M1 Band 4

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
Radiated Spurious Emissions below 1GHz	20300 (1745.00 MHz)	20 MHz	16QAM	1 RB

For Cat-M1 Band 5

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
Radiated Spurious Emissions below 1GHz	20525 (836.50 MHz)	10 MHz	16QAM	1 RB

For Cat-M1 Band 12

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
Radiated Spurious Emissions below 1GHz	23095 (707.50 MHz)	5 MHz	QPSK	1 RB

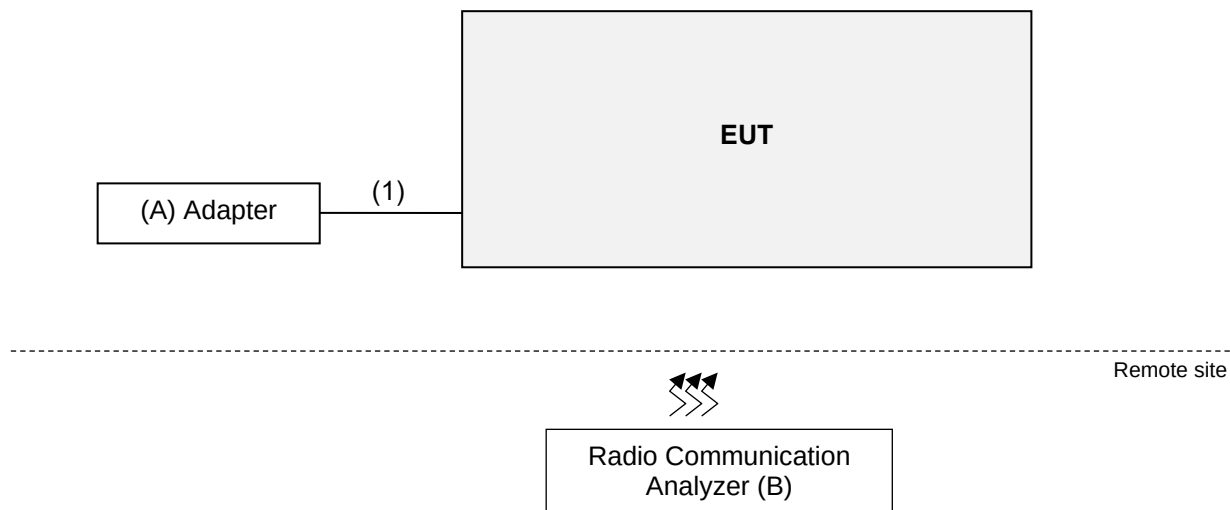
For Cat-M1 Band 13

Test Item	Tested Channel	Channel Bandwidth	Modulation	Mode
Radiated Spurious Emissions below 1GHz	23255 (784.50 MHz)	5 MHz	16QAM	1 RB

3.4 Test Program Used and Operation Descriptions

There is no need to controlling software during the test, and the EUT can be paired with the Radio Communication Analyzer to test the connection when it is powered on.

3.5 Connection Diagram of EUT and Peripheral Devices



3.6 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Adapter	halo	RH-050100US	N/A	N/A	Provided by Lab
B.	Radio Communication Analyzer	Anritsu	MT8821C	6201462755	N/A	Provided by Lab

No.	Cable Descriptions	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Qty.)	Remark
1.	Type C Cable	1	1.2	Yes	0	Accessory of the EUT (for RF Setup)

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Radiated Spurious Emissions below 1GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	MFT-151SS-0.5T	N/A	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-1213	2024/10/14	2025/10/13
EXA Signal Analyzer Agilent	N9010A	MY52220207	2024/12/30	2025/12/29
Loop Antenna TESEQ	HLA 6121	45745	2024/8/21	2025/8/20
MXE EMI Receiver Keysight	N9038B	MY60180019	2025/1/15	2026/1/14
Preamplifier EMCI	EMC330N	980782	2025/1/14	2026/1/13
RF Coaxial Cable EMCI	EMCCFD400-NM-NM-500	201233	2025/1/14	2026/1/13
	EMCCFD400-NM-NM-3000	201235	2025/1/14	2026/1/13
	EMCCFD400-NM-NM-9000	201236(with PAD)	2025/1/14	2026/1/13
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MF-7802BS	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802BS	MF780208674	N/A	N/A

Notes:

1. The test was performed in WM - 966 chamber 8.
2. Tested Date: 2025/6/25

5 Limits of Test Items

5.1 Radiated Spurious Emissions below 1GHz

For Cat-M1 Band 2, Cat-M1 Band 5:

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13 dBm.

For Cat-M1 Band 4:

According to FCC 47 CFR part 27.53(h), for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log(P)$ dB. The limit of emission is equal to -13 dBm.

For Cat-M1 Band 12:

According to FCC 47 CFR part 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. The limit of emissions is equal to -13 dBm.

For Cat-M1 Band 13:

According to FCC 47 CFR part 27.53(c)(2), for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. The limit of emissions is equal to -13 dBm.

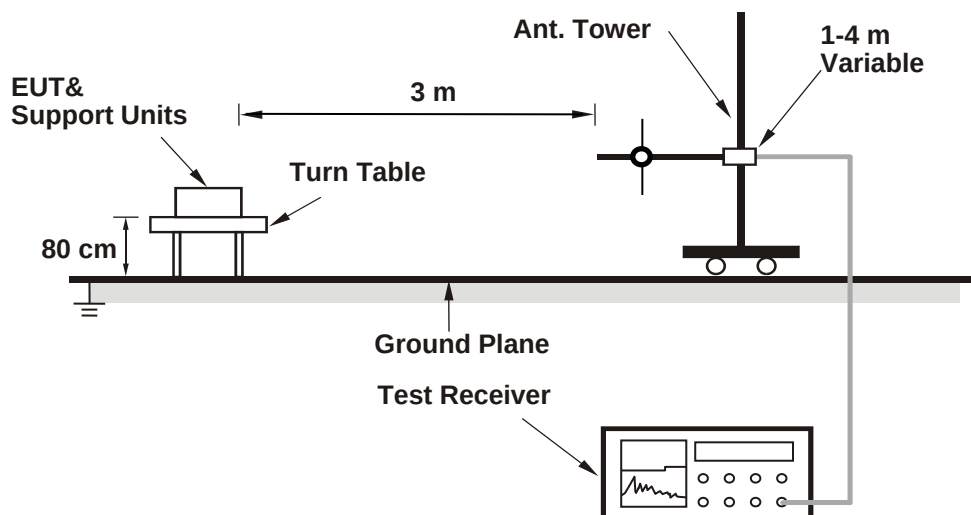
For operations in the 775-788 MHz, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz (EIRP). The limit of emissions is equal to -40 dBm.

6 Test Arrangements

6.1 Radiated Spurious Emissions below 1GHz

6.1.1 Test Setup

For radiated emission 30 MHz to 1 GHz



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

6.1.2 Test Procedure

The EUT is configured by emulator to set data modulation and maximum power using WWAN technology.

- In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) height of turn table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- The height of antenna 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.
- Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
- Following C63.26 section 5.5 and 5.2.7
- $EIRP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m.
- $ERP (dBm) = E (dB\mu V/m) + 20\log(D) - 104.8 - 2.15$; where D is the measurement distance (in the far field region) in m.

Note:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz. Set detector=average
- The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

7 Test Results of Test Item

7.1 Radiated Spurious Emissions below 1GHz

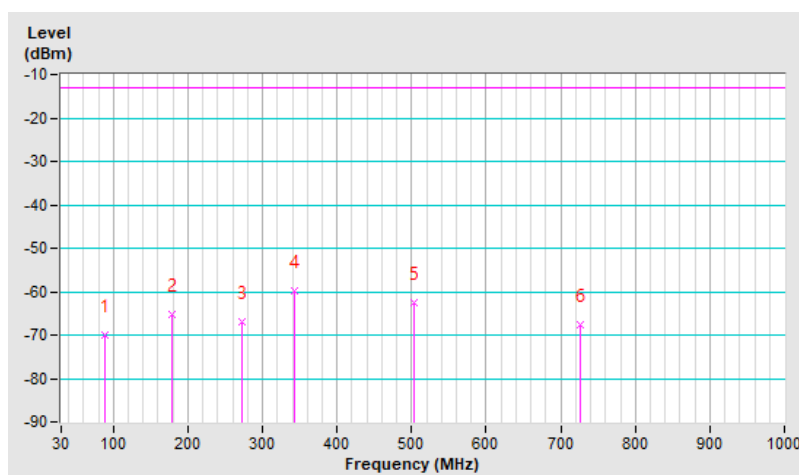
7.1.1 Cat-M1 Band 2

RF Mode	Cat-M1 Band 2 Channel Bandwidth: 1.4MHz	Channel	CH 19193 : 1909.30 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	88.20	-69.90	-13.00	-56.90	1.42 H	194	44.20	-114.10
2	178.41	-65.10	-13.00	-52.10	1.75 H	108	44.22	-109.32
3	273.47	-66.80	-13.00	-53.80	1.22 H	208	41.42	-108.22
4	342.34	-59.90	-13.00	-46.90	1.51 H	140	46.39	-106.29
5	502.39	-62.50	-13.00	-49.50	1.50 H	203	40.04	-102.54
6	725.49	-67.70	-13.00	-54.70	1.58 H	214	30.27	-97.97

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

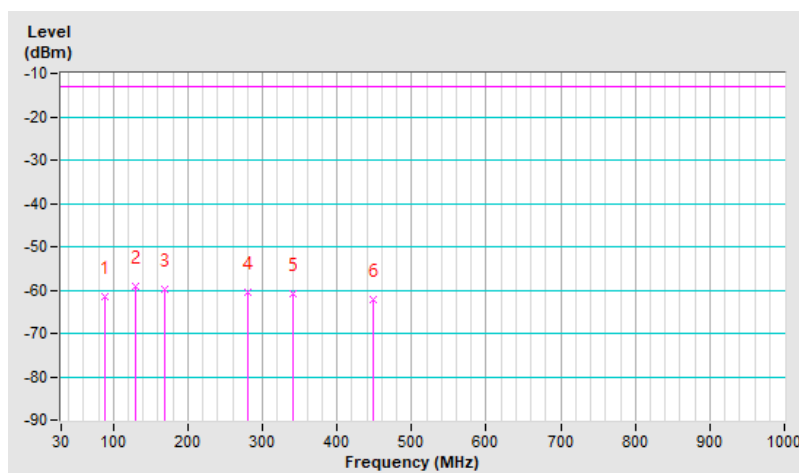


RF Mode	Cat-M1 Band 2 Channel Bandwidth: 1.4MHz	Channel	CH 19193 : 1909.30 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	88.20	-61.40	-13.00	-48.40	1.48 V	243	52.70	-114.10
2	129.91	-59.20	-13.00	-46.20	1.72 V	196	50.11	-109.31
3	168.71	-59.70	-13.00	-46.70	1.95 V	253	48.63	-108.33
4	280.26	-60.40	-13.00	-47.40	1.04 V	158	47.49	-107.89
5	341.37	-60.80	-13.00	-47.80	1.22 V	184	45.49	-106.29
6	448.07	-62.10	-13.00	-49.10	2.24 V	104	41.11	-103.21

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



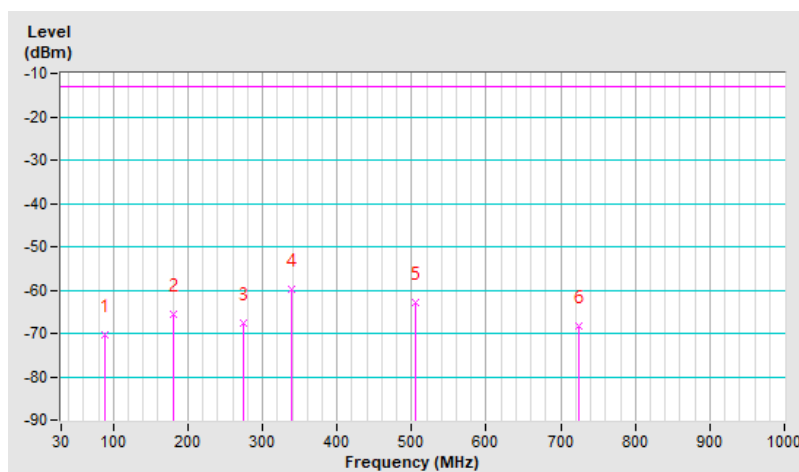
7.1.2 Cat-M1 Band 4

RF Mode	Cat-M1 Band 4 Channel Bandwidth: 20MHz	Channel	CH 20300 : 1745 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	87.94	-70.38	-13.00	-57.38	1.38 H	122	43.71	-114.09
2	180.16	-65.73	-13.00	-52.73	1.16 H	205	43.91	-109.64
3	275.16	-67.73	-13.00	-54.73	1.59 H	14	40.38	-108.11
4	339.15	-59.94	-13.00	-46.94	1.05 H	223	46.35	-106.29
5	504.71	-62.81	-13.00	-49.81	2.23 H	184	39.68	-102.49
6	724.46	-68.15	-13.00	-55.15	1.31 H	108	29.84	-97.99

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

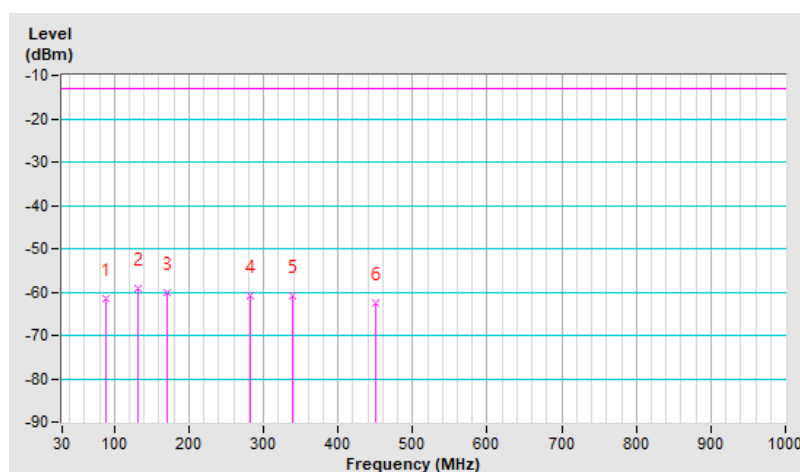


RF Mode	Cat-M1 Band 4 Channel Bandwidth: 20MHz	Channel	CH 20300 : 1745 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	89.14	-61.64	-13.00	-48.64	1.22 V	148	52.49	-114.13
2	132.56	-59.30	-13.00	-46.30	1.66 V	104	49.77	-109.07
3	170.46	-60.00	-13.00	-47.00	1.18 V	280	48.42	-108.42
4	281.80	-60.70	-13.00	-47.70	1.65 V	144	47.15	-107.85
5	339.51	-61.00	-13.00	-48.00	1.09 V	214	45.29	-106.29
6	449.53	-62.40	-13.00	-49.40	2.14 V	155	40.76	-103.16

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. $Margin\ value = EIRP - Limit\ value$
4. The other EIRP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



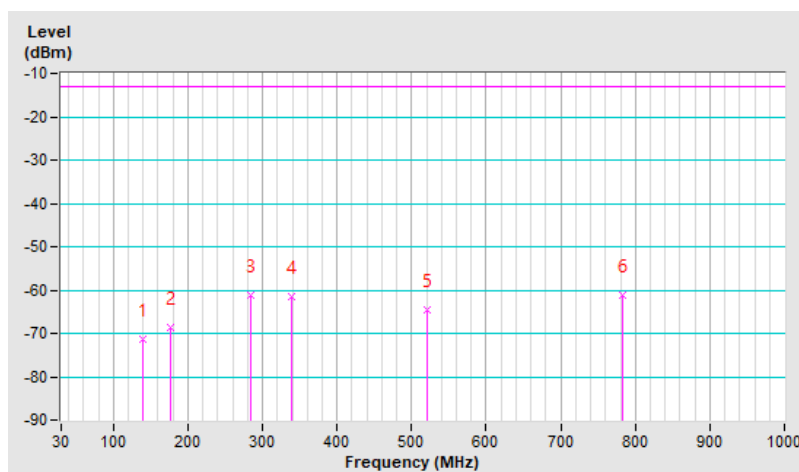
7.1.3 Cat-M1 Band 5

RF Mode	Cat-M1 Band 5 Channel Bandwidth: 10MHz	Channel	CH 20525 : 836.50 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	139.61	-71.46	-13.00	-58.46	1.53 H	208	39.14	-110.60
2	176.47	-68.59	-13.00	-55.59	1.72 H	116	42.64	-111.23
3	284.14	-61.07	-13.00	-48.07	1.84 H	159	48.85	-109.92
4	338.46	-61.53	-13.00	-48.53	2.23 H	104	46.91	-108.44
5	520.82	-64.60	-13.00	-51.60	1.96 H	206	39.69	-104.29
6	783.69	-61.20	-13.00	-48.20	1.51 H	140	37.73	-98.93

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

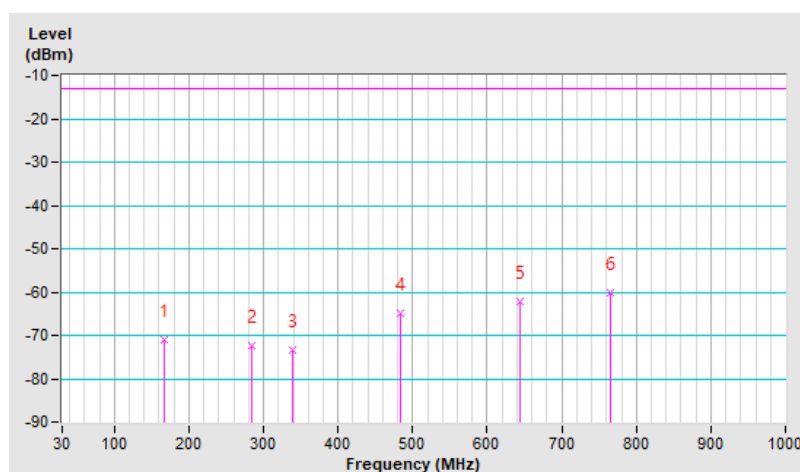


RF Mode	Cat-M1 Band 5 Channel Bandwidth: 10MHz	Channel	CH 20525 : 836.50 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	166.77	-71.17	-13.00	-58.17	1.85 V	146	39.16	-110.33
2	285.11	-72.27	-13.00	-59.27	1.72 V	150	37.63	-109.90
3	338.46	-73.28	-13.00	-60.28	1.08 V	151	35.16	-108.44
4	482.99	-65.08	-13.00	-52.08	2.04 V	16	39.85	-104.93
5	644.98	-62.20	-13.00	-49.20	1.94 V	253	39.20	-101.40
6	765.26	-60.23	-13.00	-47.23	1.74 V	151	38.85	-99.08

Remarks:

- ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + $20\log(D) - 104.8 - 2.15$
- Margin value = ERP – Limit value
- The other ERP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
- The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



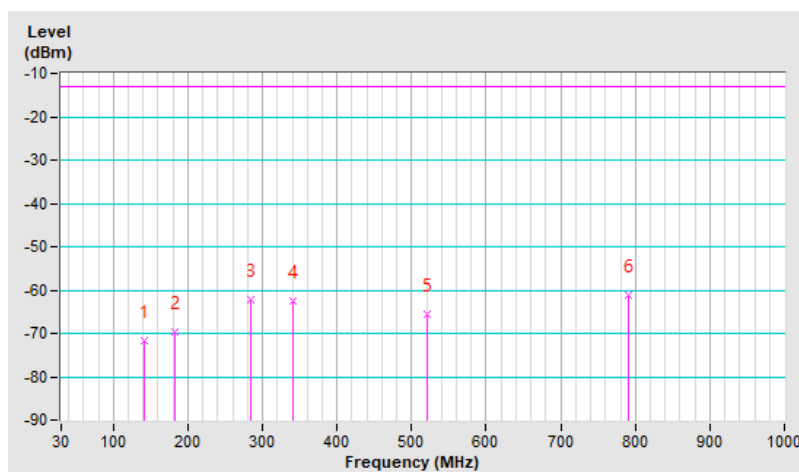
7.1.4 Cat-M1 Band 12

RF Mode	Cat-M1 Band 12 Channel Bandwidth: 5MHz	Channel	CH 23095 : 707.50 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	142.14	-71.63	-13.00	-58.63	1.44 H	196	38.79	-110.42
2	182.04	-69.62	-13.00	-56.62	1.59 H	131	42.46	-112.08
3	285.04	-62.34	-13.00	-49.34	1.28 H	250	47.56	-109.90
4	340.16	-62.65	-13.00	-49.65	1.18 H	201	45.79	-108.44
5	521.26	-65.49	-13.00	-52.49	1.53 H	206	38.79	-104.28
6	790.14	-61.25	-13.00	-48.25	1.35 H	164	37.55	-98.80

Remarks:

- ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
+ 20log(D) – 104.8 – 2.15
- Margin value = ERP – Limit value
- The other ERP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
- The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

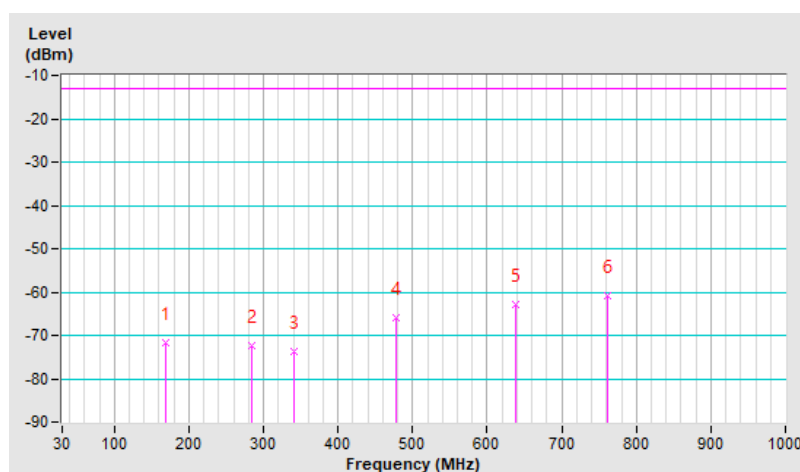


RF Mode	Cat-M1 Band 12 Channel Bandwidth: 5MHz	Channel	CH 23095 : 707.50 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	168.05	-71.61	-13.00	-58.61	1.15 V	240	38.76	-110.37
2	284.23	-72.51	-13.00	-59.51	1.43 V	250	37.41	-109.92
3	340.12	-73.75	-13.00	-60.75	1.32 V	148	34.69	-108.44
4	478.11	-66.02	-13.00	-53.02	1.59 V	5	38.94	-104.96
5	637.46	-62.80	-13.00	-49.80	1.56 V	204	38.77	-101.57
6	761.36	-60.95	-13.00	-47.95	1.41 V	204	38.22	-99.17

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



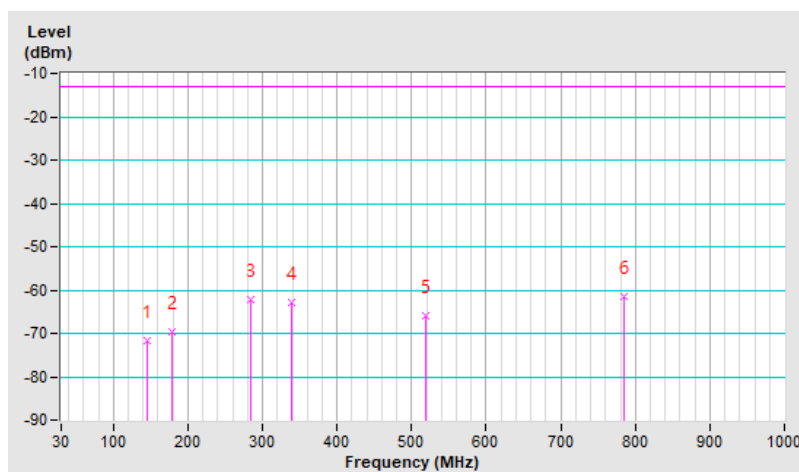
7.1.5 Cat-M1 Band 13

RF Mode	Cat-M1 Band 13 Channel Bandwidth: 5MHz	Channel	CH 23255 : 784.50 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	145.25	-71.78	-13.00	-58.78	1.80 H	51	38.43	-110.21
2	179.16	-69.83	-13.00	-56.83	1.12 H	147	41.78	-111.61
3	284.05	-62.06	-13.00	-49.06	1.28 H	271	47.86	-109.92
4	338.16	-62.86	-13.00	-49.86	1.60 H	235	45.58	-108.44
5	518.41	-65.89	-13.00	-52.89	1.82 H	122	38.43	-104.32
6	784.28	-61.53	-13.00	-48.53	2.04 H	155	37.41	-98.94

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

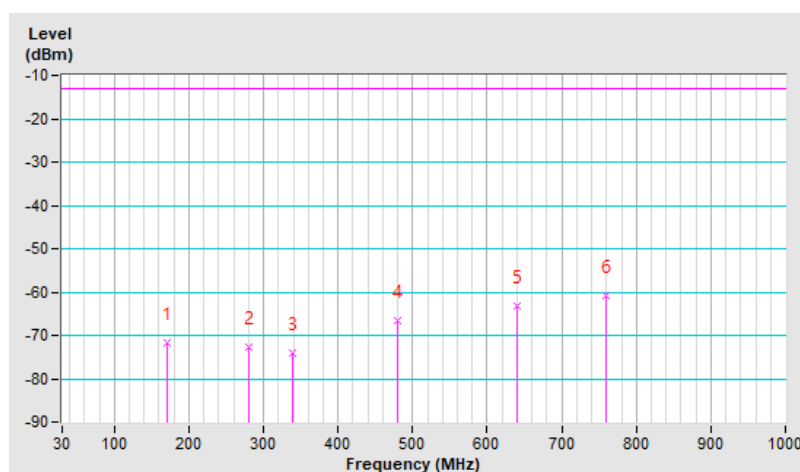


RF Mode	Cat-M1 Band 13 Channel Bandwidth: 5MHz	Channel	CH 23255 : 784.50 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	1 MHz/3 MHz (RMS)
Input Power	120 Vac, 60 Hz	Environmental Conditions	23 °C, 67 % RH
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	171.14	-71.73	-13.00	-58.73	1.43 V	58	38.92	-110.65
2	281.14	-72.77	-13.00	-59.77	1.35 V	109	37.25	-110.02
3	339.51	-74.06	-13.00	-61.06	1.05 V	20	34.38	-108.44
4	479.35	-66.73	-13.00	-53.73	1.64 V	71	38.22	-104.95
5	640.15	-63.15	-13.00	-50.15	1.94 V	104	38.36	-101.51
6	759.16	-60.85	-13.00	-47.85	1.08 V	27	38.35	-99.20

Remarks:

1. $ERP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8 - 2.15$
3. $Margin\ value = ERP - Limit\ value$
4. The other ERP levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

The address and road map of all our labs can be found in our web site also.

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