

NCC RADIO TEST REPORT

Product name	好啦機器人HolaBot
Applicant	深圳市普渡科技有限公司
Manufacture	深圳市普渡科技有限公司
Rating(s)	DC29V from adapter or DC25.2V from battery
Trademark	Pudu
Model and/or type reference	HL100
Standard	LP0002:2018
Test Result	Pass

Date of receipt : 11-09-2020

Date of Issue : 12-30-2020

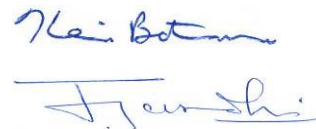
Signature :



NCC RADIO TEST REPORT**Report Reference No.**..... M201118N2-06

Compiled by (+ signature) Kevin Bothmann

Approved by (+ signature) Jay Gandhi



Date of issue 2020-12-30

Applicant's name 深圳市普渡科技有限公司

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Address 深圳市南山區粵海街道科技園社區科發路 10 號維用大廈 301

Test specification:

Standard LP0002: 2018

Test procedure EIA 603、ANSI、FCC/47 CFR/2.1046、2.1047、2.1049、2.1051、2.1053 and 2.1055

Non-standard test method... N/A

Test item description

Product name 好啦機器人 HolaBot

Trademark Pudu

Model and/or type reference HL100

Rating(s) DC29V from adapter or DC25.2V from battery

Testing Laboratory information

Testing Laboratory Name Electro Magnetic Test, Inc.

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Testing.....

Date of receipt of test item..... Nov. 02, 2020

Date (s) of performance of tests..... Nov. 02~ Dec 30, 2020

Date of Issue Dec. 30, 2020

Test Result **Pass**

GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Electro Magnetic Test, Inc., which is an independent testing and consulting firm. The test report is based on testing performed Electro Magnetic Test, Inc. personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Federal Government.

Electro Magnetic Test, Inc. is recognized by the following agencies for performing EMI/EMC testing:

COUNTRY	AGENCY	IDENTIFYING #
USA	Federal Communications Commission (FCC) (EMT's test site is recognized by the FCC)	Registration Number: 90576
USA, Canada, Taiwan, Australia/New Zealand, European Community	National Voluntary Lab Accreditation Program (NVLAP) (EMT is accredited by NVLAP. A copy of the NVLAP Scope Of Accreditation is available upon request.)	Lab Code: 200147-0
Canada	Industry Canada	File No.: IC 2804
Japan	Voluntary Control Council For Interference (VCCI)	See Below
	Open Field Test Site "A"	R-589
	Mains Conducted Emissions Test Site "A"	C-604
	Telecom Conducted Emissions Test Site "A"	T-1655
	3 Meter Semi-Anechoic Chamber Site "E"	R-3227
	3 Meter Semi-Anechoic Chamber Site "E" (1GHz – 6GHz)	G-219
	Mains Conducted Emissions Test Site "E"	C-35793
	Telecom Conducted Emissions Test Site "E"	T-1715
Korea	Ministry of Information and Communication's Radio Research Laboratory (RRL) under the Asia Pacific Economic Cooperation (APEC) Mutual Recognition Arrangement (A copy of the Scope Of Accreditation is available upon request)	US0036
Taiwan	Bureau Of Standards, Metrology and Inspection (BSMI)	Reference Number: SL2-IN-E-1024
Australia / New Zealand	Australian Communications Authority (AUSTEL)	*

***THESE AGENCIES DO NOT ISSUE AN IDENTIFYING NUMBER TO TEST LABS.**

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

LP0002 : 2018			
Standard Section	Test Item	Judgment	Remark
2.3	Conducted Emission	PASS	None
3.10.1.5/2.8	Radiated Spurious Emission	PASS	None
4.8.1.2	Peak Output Power	PASS	None
4.8.1.5	Occupied Bandwidth	PASS	None
4.8.1.5	Hopping Channel Separation	PASS	None
4.8.1.5	Number of Hopping Frequency	PASS	None
4.8.1.5	Dwell Time	PASS	None
4.8.1.4	Restricted Bands	PASS	None
4.8.1.3	Antenna Requirement	PASS	None

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report.

1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	1.38dB
2	Radiated Emission Test	3.17dB
3	RF power,conducted	0.16dB
4	Spurious emissions,conducted	0.21dB
5	All emissions,radiated(<1G)	4.68dB
6	All emissions,radiated(>1G)	4.89dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	好啦機器人 HolaBot	
Trade Name	Pudu	
Model Name	HL100	
Serial Model Name	N/A	
Model Difference	N/A	
Product Description	The EUT is a 好啦機器人HolaBot	
	Operation Frequency:	920-925 MHz
	Modulation Type:	Lora
	Number Of Channel	24 CH
	Antenna Designation:	Please see Note 3.
	Antenna Gain(Peak)	2.5 dBi
	Output Power:	18.540dBm (Max.)
Channel List	Please refer to the Note 2.	
Power Rating	DC29V from adapter or DC25.2V from battery	
Connecting I/O Port(s)	Please refer to the User's Manual	
Products Covered	N/A	
EUT Modification(s)	N/A	
Model difference	N/A	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	920.2	09	922.0	18	923.8
01	920.4	10	922.2	19	924.0
02	920.6	11	922.4	20	924.2
03	920.8	12	922.6	21	924.4
04	921.0	13	922.8	22	924.6
05	921.2	14	923.0	23	924.8
06	921.4	15	923.2	--	--
07	921.6	16	923.4	--	--
08	921.8	17	923.6	--	--

3.

Table for Filed Antenna

Manufacture	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
Shenzhen eyebook Technology Co., Ltd	PJ0003_Ant0002	PCB Antenna	N/A	2.5dBi	Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Low CH
Mode 2	High CH

For Conducted Emission	
Final Test Mode	Description
Mode 1	Low CH

For Radiated Emission	
Final Test Mode	Description
Mode 1	Low CH
Mode 2	High CH

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

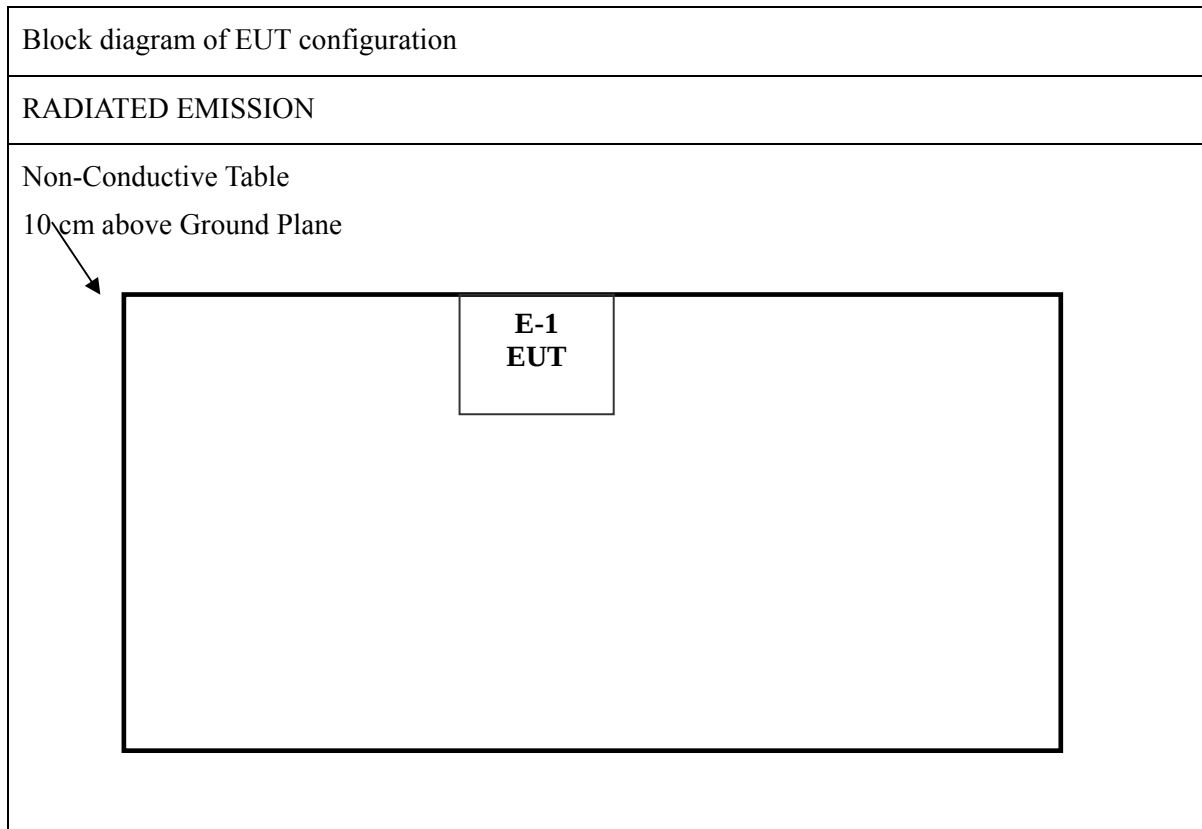
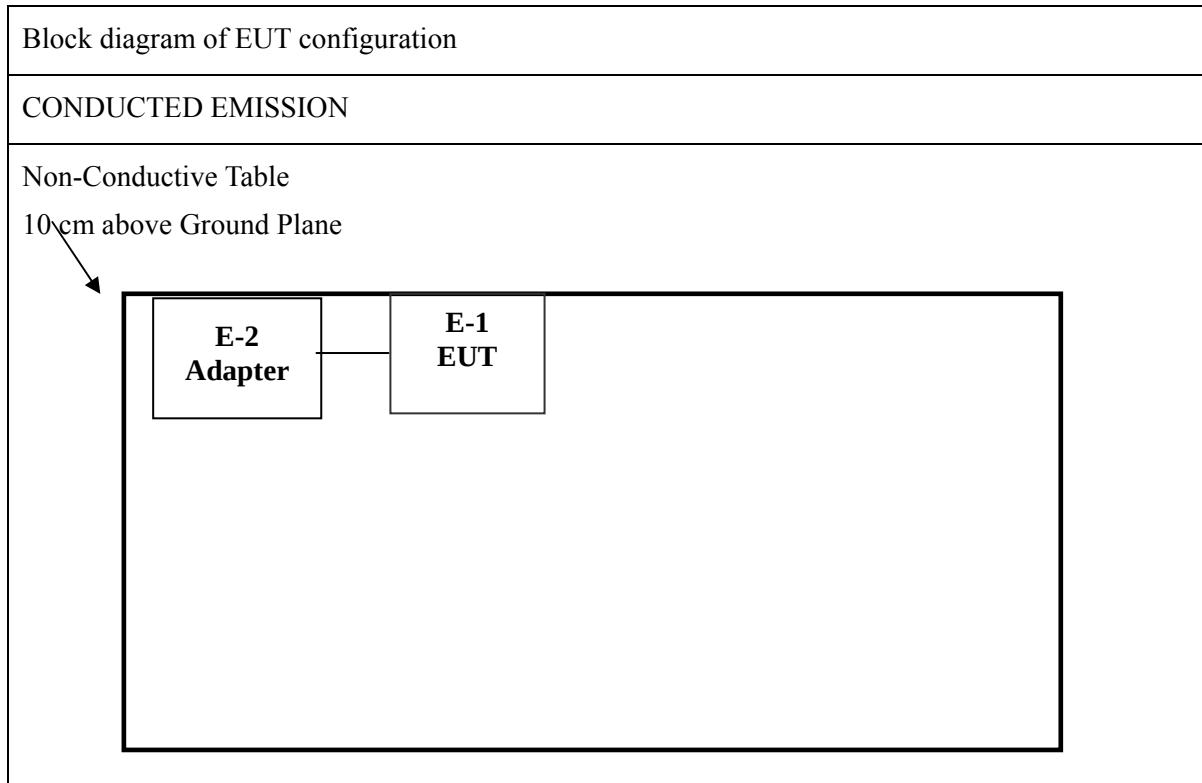
2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Power Set	10		
Test software Version	V2.2	Test program:	SComAssistant
Frequency	920.2 MHz	924.8 MHz	
Parameters	Default	Default	

1. Install a serial debugging tool;
2. USB port for computer connection.
3. Debugging assistant software selected serial port, Baud rate and other data.
4. Check hexadecimal display, hexadecimal send.
5. Enter the command, click to send data manually.

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	好啦機器人 HolaBot	Pudu	HL100	N/A	N/A	EUT
E-2	Adapter	Pudu	FY2903500	N/A	N/A	EUT

Item	Equipment	Mfr/Brand	Model/Type No.	Note
1	Removable Battery	Pudu	RB01	EUT
2	Radar 1#	YDLIDAR	G7	EUT
3	Radar 2#	YDLIDAR	TG30	EUT
4	Radar 3#	SLAMTEC	S1	EUT
5	Display Screen 1#	Shenzhen eyebook Technology Co., Ltd	PB101GGJ5119QT001	EUT
6	Display Screen 2#	Shenzhen eyebook Technology Co., Ltd	10.1 InchWUXGA	EUT
7	RJ45 Line	UGREEN	11268-3m	Test Accessory*

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” means “shielded” or “with ferrite core”; “NO” means “unshielded” or “without ferrite core”
- (4) “*”: In this report, the applicant did not provide the accompanying accessories with the equipment. The accessories were provided by the laboratory (or the applicant) and inspected simultaneously.

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3013A07296	April 29, 2020	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	April 29, 2020	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650	2521A00584	April 29, 2020	1 Year
Preamplifier	Com Power	PA-102	1482	April 29, 2020	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 8, 2019	1 Year
LISN	Com Power	LI-200	12012	September 09, 2020	1 Year
LISN	Com Power	LI-200	12214	September 09, 2020	1 Year
LISN	Com Power	LI-200	1767	September 09, 2020	1 Year
LISN	Com Power	LI-200	1768	September 09, 2020	1 Year
Biconical Antenna	Com Power	AB-100	01557	December 29, 2019	1 Year
Log Periodic Antenna	Com Power	AL-100	16037	December 22, 2019	1 Year
Horn Antenna	Com Power	AHA-118	711054	December 22, 2019	1 Year
Antenna Mast	Com Power	AM-400	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Dell, Inc.	DHS	DNSV641	N/A	N/A
Printer	Hewlett Packard	C8124A	CN39B2234T	N/A	N/A
Plotter	Hewlett Packard	7470A	2308A96499	N/A	N/A

EMI Test Equipment (Continued)

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
EMI Receiver	Rohde & Schwarz	ESU40	100127	June 12, 2020	1 Year
BiConiLog Antenna	ETS-Lindgren	3142D	00102183	August 13, 2020	1 Year
Horn Antenna	ETS-Lindgren	3117	00109294	May 6, 2020	1 Year
Preamplifier	Rohde & Schwarz	TS-PR18	100056	June 12, 2020	1 Year
Antenna Mast	ETS-Lindgren	2175	00095727	N/A	N/A
Turntable	ETS-Lindgren	2187-3.0	00118231	N/A	N/A
Computer	Acer	Aspire 8930	85100050123	N/A	N/A
Multi-Function Controller	ETS-Lindgren	2090	00102270	N/A	N/A
Loop Antenna	ARA	PLA-1030/B	1029	May 19, 2020	1 Year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5			66 - 56 *	56 - 46 *	CISPR
0.50 -5.0			56.00	46.00	CISPR
5.0 -30.0			60.00	50.00	CISPR

0.15 -0.5			66 - 56 *	56 - 46 *	LP0002
0.50 -5.0			56.00	46.00	LP0002
5.0 -30.0			60.00	50.00	LP0002

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

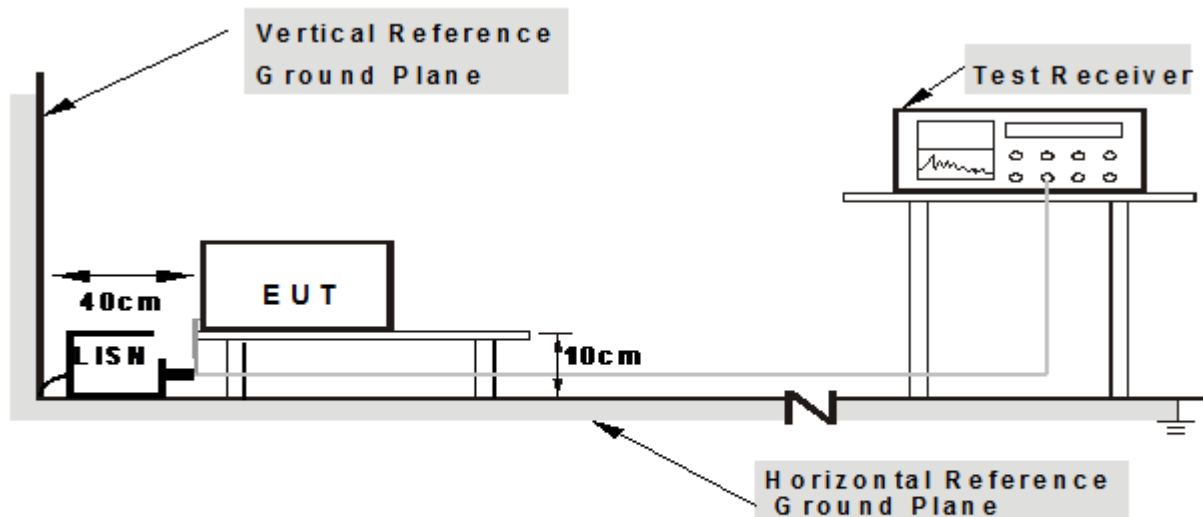
3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP

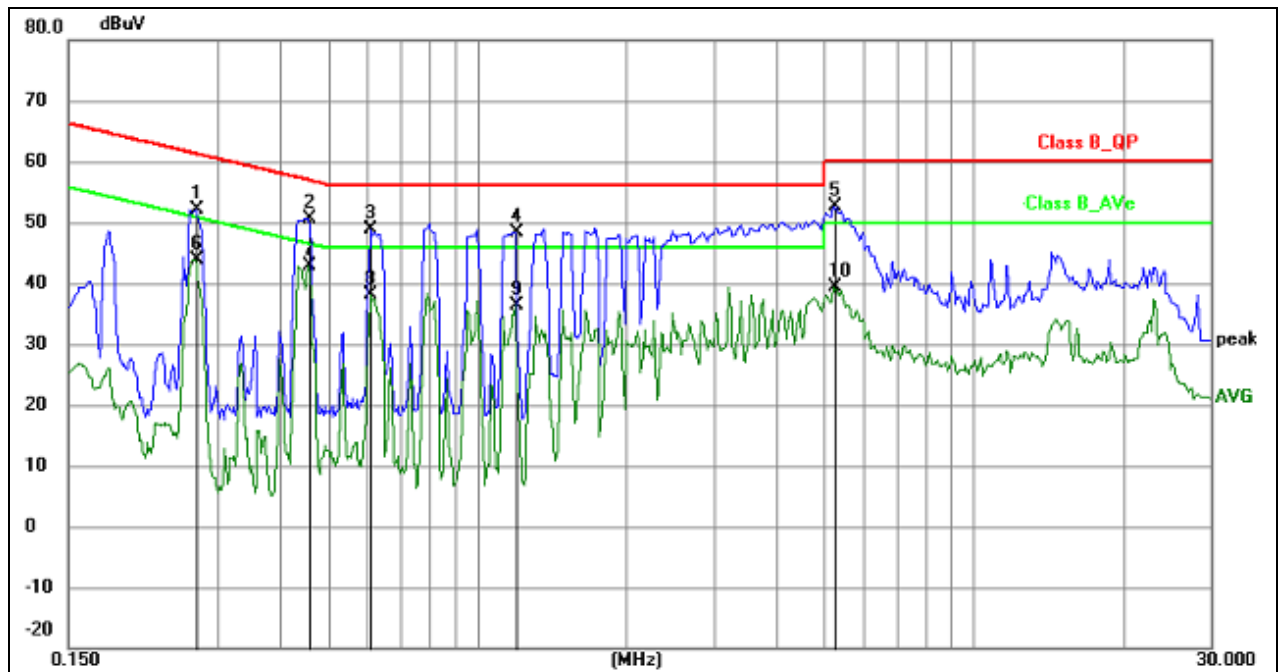


Note: 1.Support units were connected to second LISN.

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

3.1.5 TEST RESULTS

EUT :	好啦機器人 HolaBot	Model Name. :	HL100
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2020-11-12
Test Mode :	TX920.2MHz (Low CH-worst case)	Phase :	L
Test Voltage :	AC 110V/60Hz for Adapter		

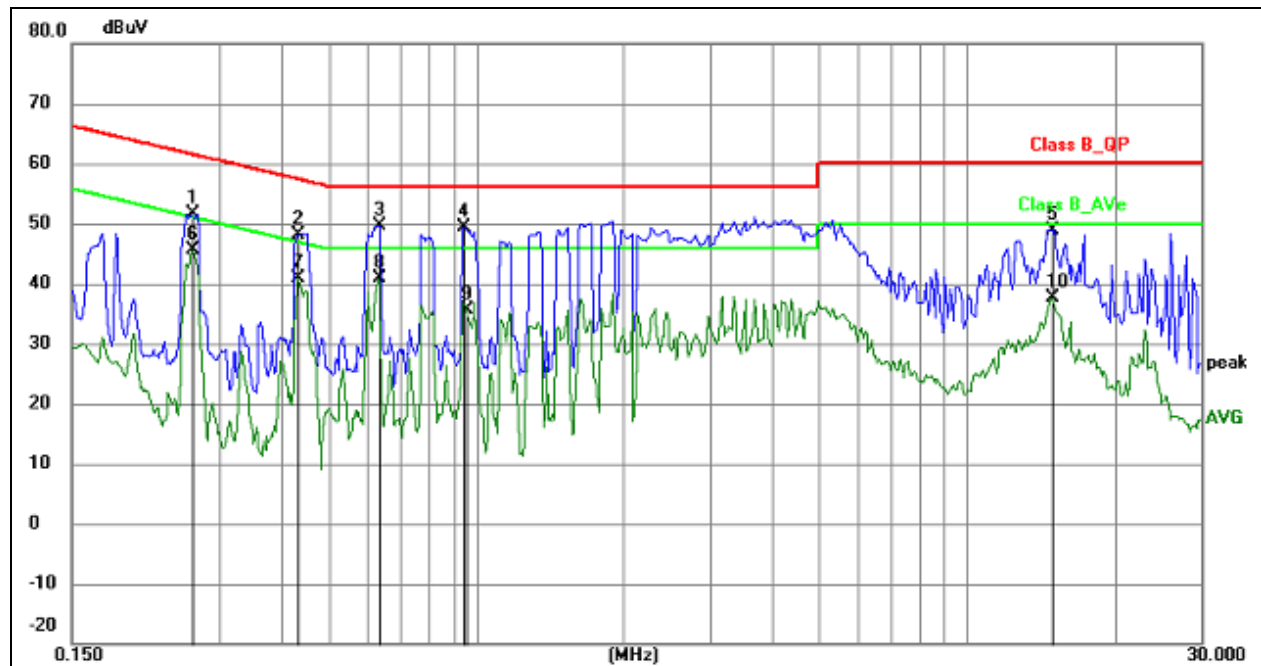


Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss + Pulse limit.
3. '*' means the worst case

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2707	42.44	9.75	52.19	61.10	-8.91	peak	P
2	0.4581	40.97	9.77	50.74	56.73	-5.99	peak	P
3	0.6107	39.01	9.78	48.79	56.00	-7.21	peak	P
4	1.1913	38.68	9.79	48.47	56.00	-7.53	peak	P
5	5.2229	42.68	9.94	52.62	60.00	-7.38	peak	P
6	0.2707	34.17	9.75	43.92	51.10	-7.18	AVG	P
7	0.4581	33.18	9.77	42.95	46.73	-3.78	AVG	P
8	0.6100	28.43	9.78	38.21	46.00	-7.79	AVG	P
9	1.1913	26.59	9.79	36.38	46.00	-9.62	AVG	P
10	5.2229	29.41	9.94	39.35	50.00	-10.65	AVG	P

EUT :	好啦機器人 HolaBot	Model Name. :	HL100
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2020-11-12
Test Mode :	TX920.2MHz (Low CH-worst case)	Phase :	N
Test Voltage :	AC 110V/60Hz for Adapter		



Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss + Pulse limit.
3. '*' means the worst case

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2631	41.98	9.75	51.73	61.33	-9.60	peak	P
2	0.4308	38.34	9.77	48.11	57.24	-9.13	peak	P
3	0.6336	39.96	9.78	49.74	56.00	-6.26	peak	P
4	0.9415	39.60	9.79	49.39	56.00	-6.61	peak	P
5	14.9068	38.38	10.38	48.76	60.00	-11.24	peak	P
6	0.2631	35.76	9.75	45.51	51.33	-5.82	AVG	P
7	0.4345	31.19	9.77	40.96	47.17	-6.21	AVG	P
8	0.6336	31.22	9.78	41.00	46.00	-5.00	AVG	P
9	0.9573	25.94	9.79	35.73	46.00	-10.27	AVG	P
10	14.8597	27.24	10.37	37.61	50.00	-12.39	AVG	P

Test result: The unit does meet the NCC requirements.

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 2.7, then the 2.8 limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

- (1) The limit for radiated test was performed according to LP0002.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

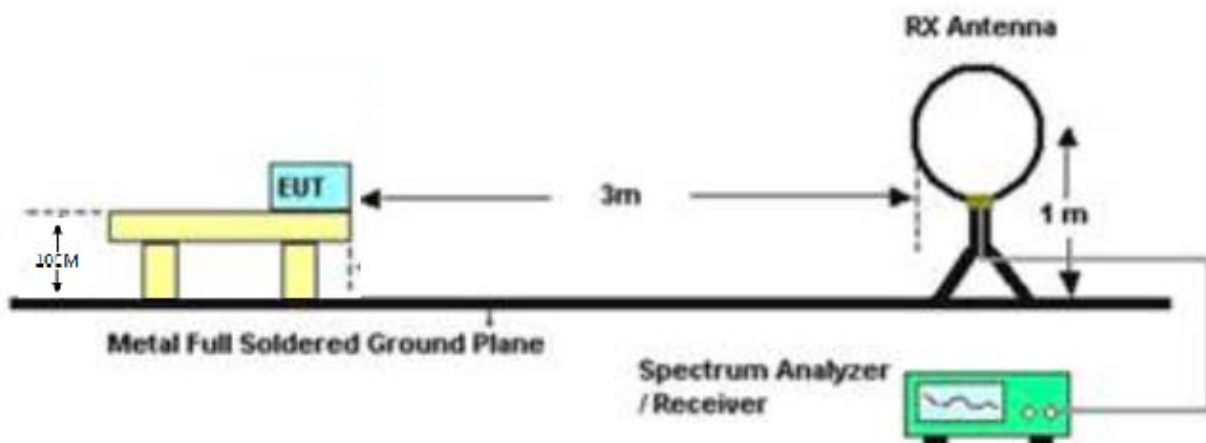
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

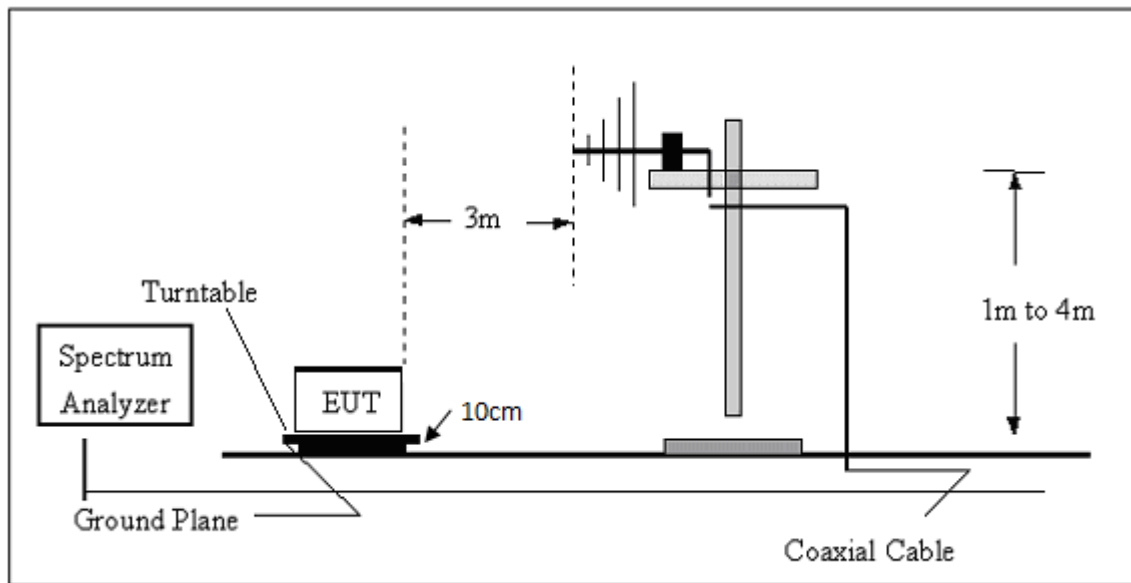
- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters (For frequencies above 1GHz, table 1.5 meters) above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 TEST SETUP

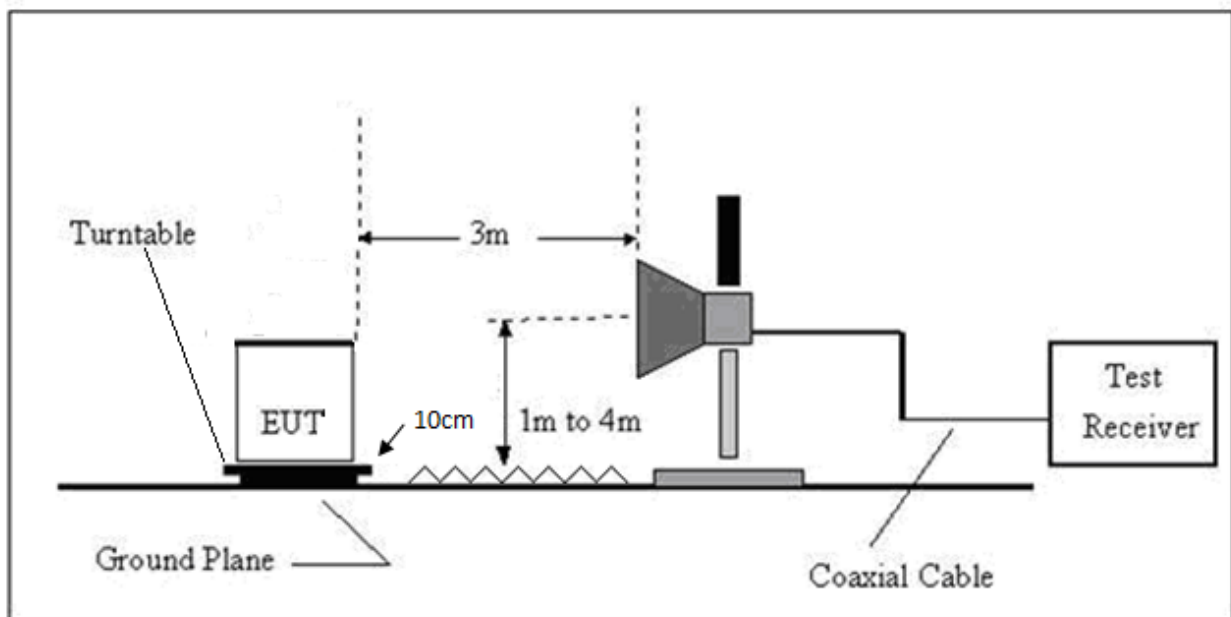
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.4 EUT OPERATING CONDITIONS

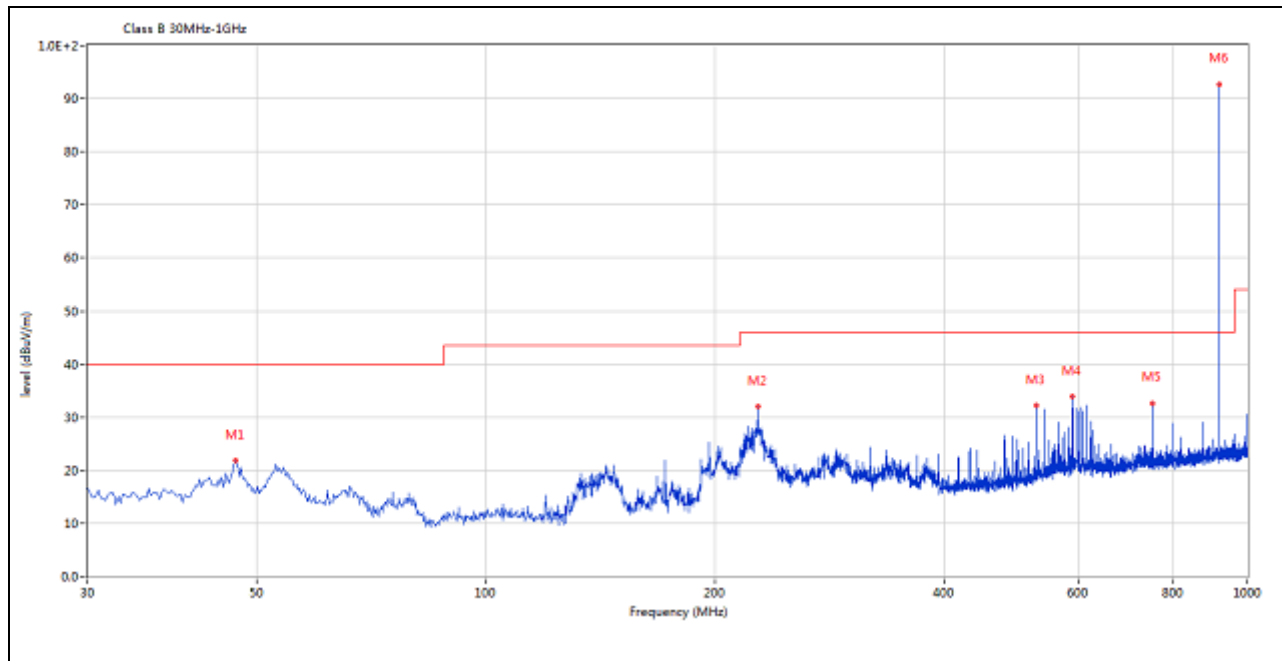
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.5 TEST RESULTS (BLOW 30 MHZ)

There is no detected blow 30MHz

3.2.6 TEST RESULTS (BETWEEN30 – 1000 MHZ)

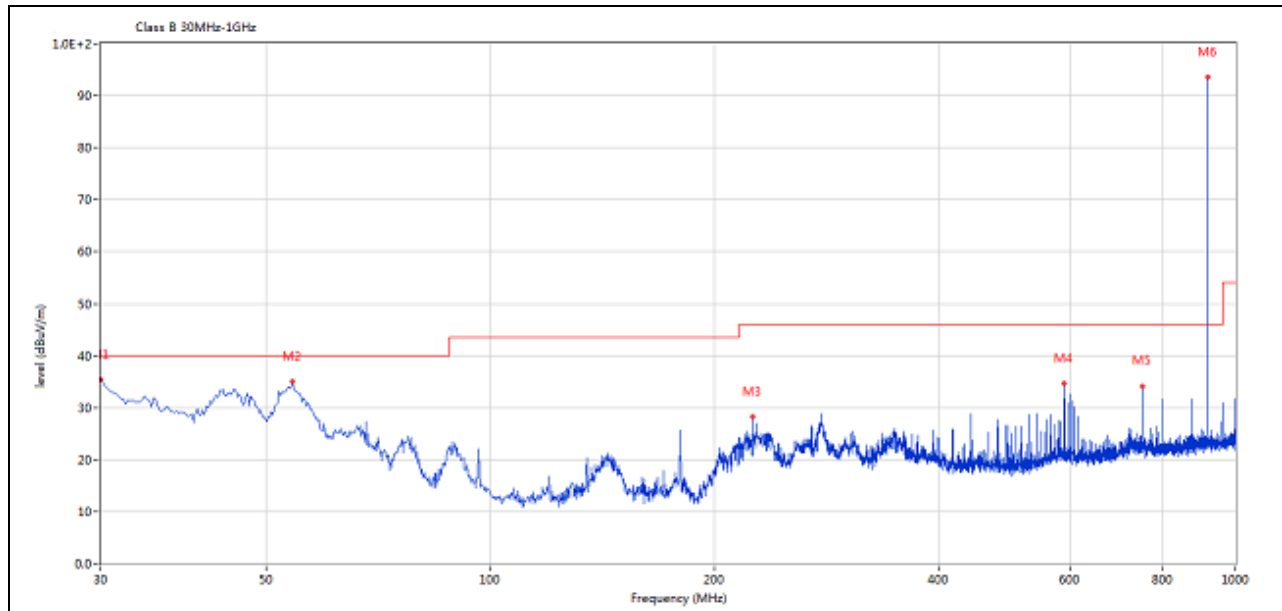
EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2020-11-12
Test Mode :	TX920.2MHz (Low CH-worst case)	Polarization :	Horizontal
Test Power :	DC25.2V from battery		



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	ANT	Verdict
1	46.971	21.76	-11.45	40.0	-18.24	Peak	Horizontal	Pass
2	227.588	31.94	-12.79	46.0	-14.06	Peak	Horizontal	Pass
3	527.971	32.14	-6.62	46.0	-13.86	Peak	Horizontal	Pass
4	589.793	33.85	-5.08	46.0	-12.15	Peak	Horizontal	Pass
5	750.045	32.57	-3.43	46.0	-13.43	Peak	Horizontal	Pass
6	921.000	92.71	-1.97	114.0	-21.29	Peak	Horizontal	Pass

EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2020-11-12
Test Mode :	TX920.2MHz (Low CH-worst case)	Polarization :	Vertical
Test Power :	DC25.2V from battery		



Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	ANT	Verdict
1	30.000	35.32	-14.19	40.0	-4.68	Peak	Vertical	Pass
2	54.244	34.94	-11.60	40.0	-5.06	Peak	Vertical	Pass
3	224.921	28.22	-12.93	46.0	-17.78	Peak	Vertical	Pass
4	589.793	34.57	-5.08	46.0	-11.43	Peak	Vertical	Pass
5	750.045	34.16	-3.43	46.0	-11.84	Peak	Vertical	Pass
6	919.510	93.54	-1.84	114.0	-20.46	Peak	Vertical	Pass

Test result: The unit does meet the NCC requirements.

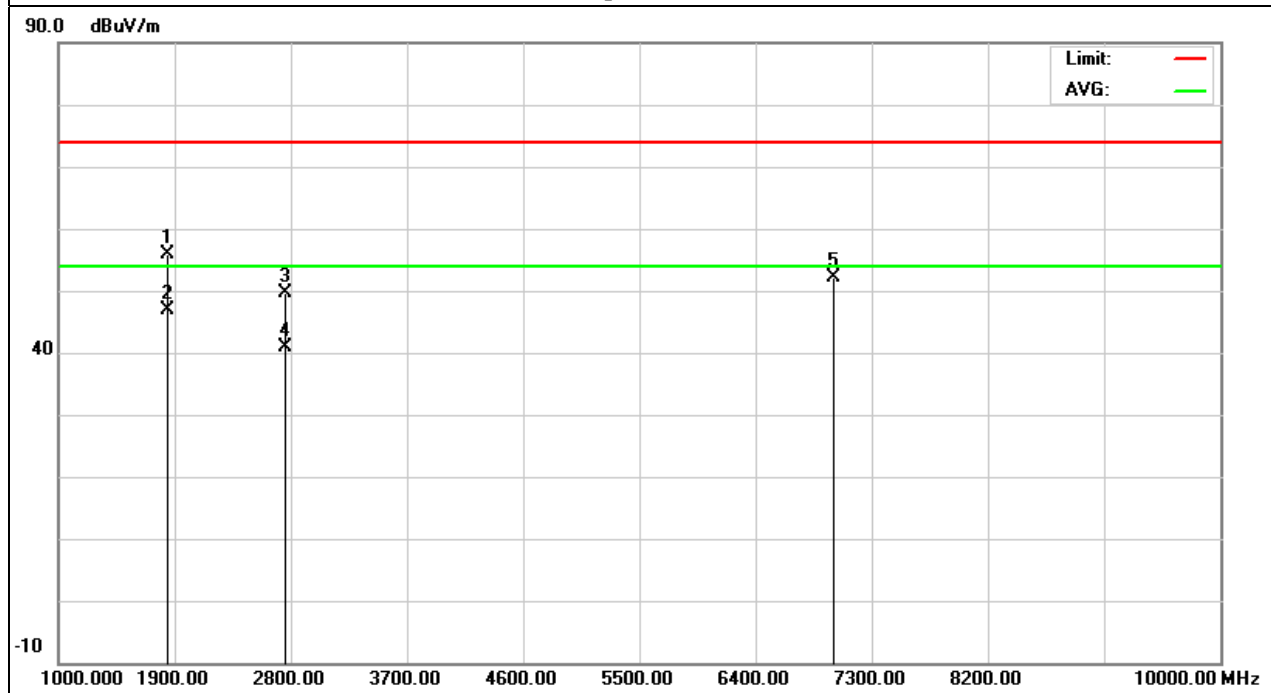
3.2.7 TEST RESULTS (ABOVE 1000 MHZ)

EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2020-11-12
Test Mode :	Mode 1(920.2MHz)	Polarization :	Vertical
Test Power :	DC25.2V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1840.40	65.36	-9.42	55.94	74.00	-18.06	peak
1840.40	56.42	-9.42	47.00	54.00	-7.00	AVG
2760.60	52.77	-3.13	49.64	74.00	-24.36	peak
2760.60	43.98	-3.13	40.85	54.00	-13.15	AVG
7011.00	45.84	6.19	52.03	74.00	-21.97	peak

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

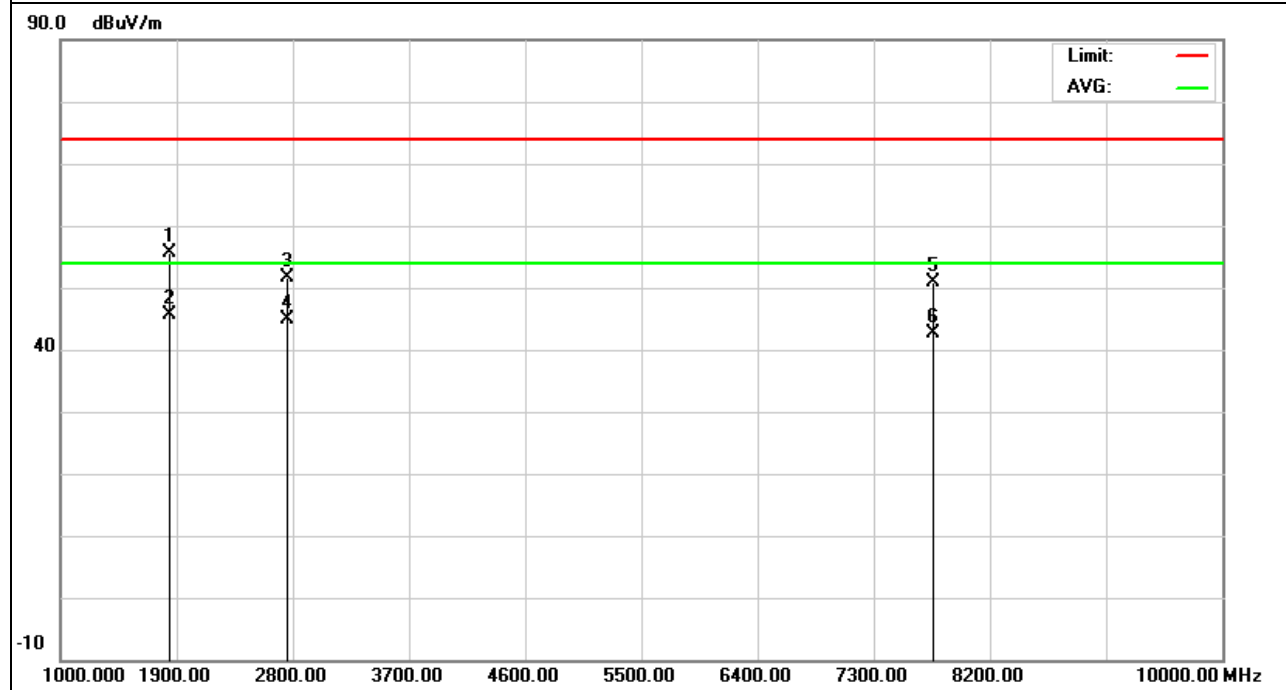


EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2020-11-12
Test Mode :	Mode 1(920.2MHz)	Polarization :	Horizontal
Test Power :	DC25.2V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1840.40	65.09	-9.42	55.67	74.00	-18.33	peak
1840.40	55.14	-9.42	45.72	54.00	-8.28	AVG
2760.60	54.76	-3.13	51.63	74.00	-22.37	peak
2760.60	47.96	-3.13	44.83	54.00	-9.17	AVG
7756.00	41.43	9.37	50.80	74.00	-23.20	peak
7756.00	33.24	9.37	42.61	54.00	-11.39	AVG

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

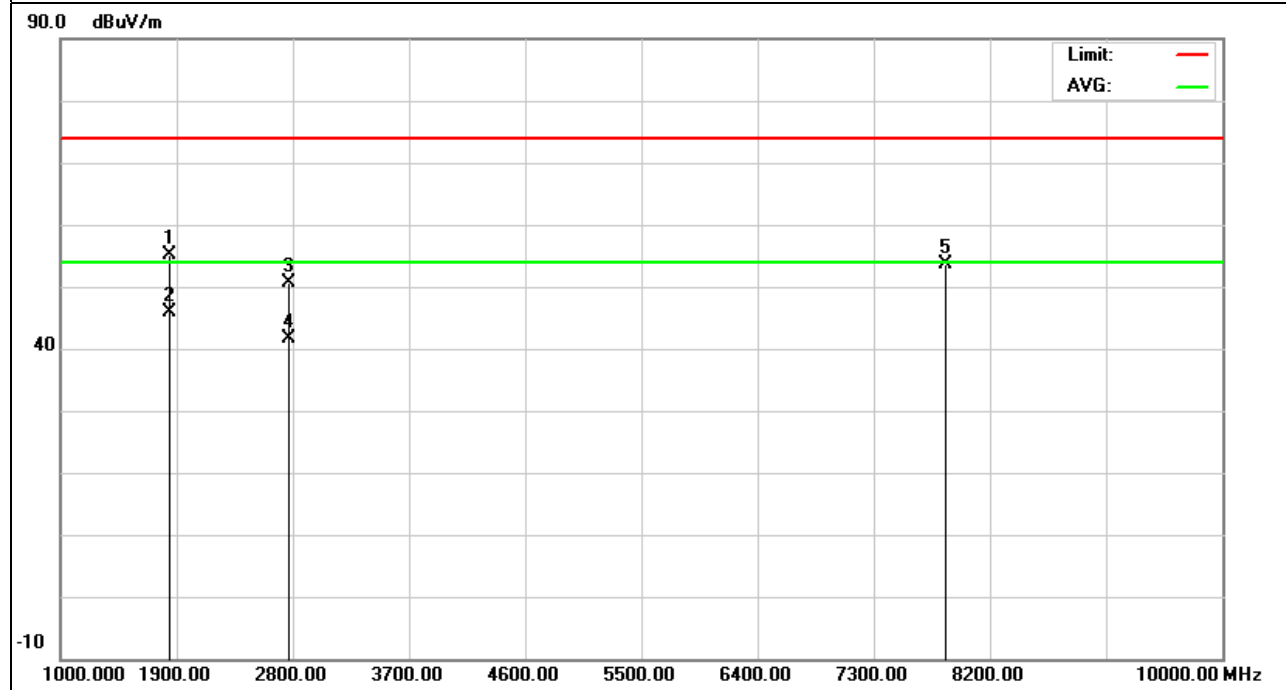


EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2020-11-12
Test Mode :	Mode 2(924.8MHz)	Polarization :	Vertical
Test Power :	DC25.2V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1849.60	64.52	-9.43	55.09	74.00	-18.91	peak
1849.60	55.36	-9.43	45.93	54.00	-8.07	AVG
2774.40	53.62	-3.03	50.59	74.00	-23.41	peak
2774.40	44.76	-3.03	41.73	54.00	-12.27	AVG
7856.22	43.85	9.78	53.63	74.00	-20.37	peak

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

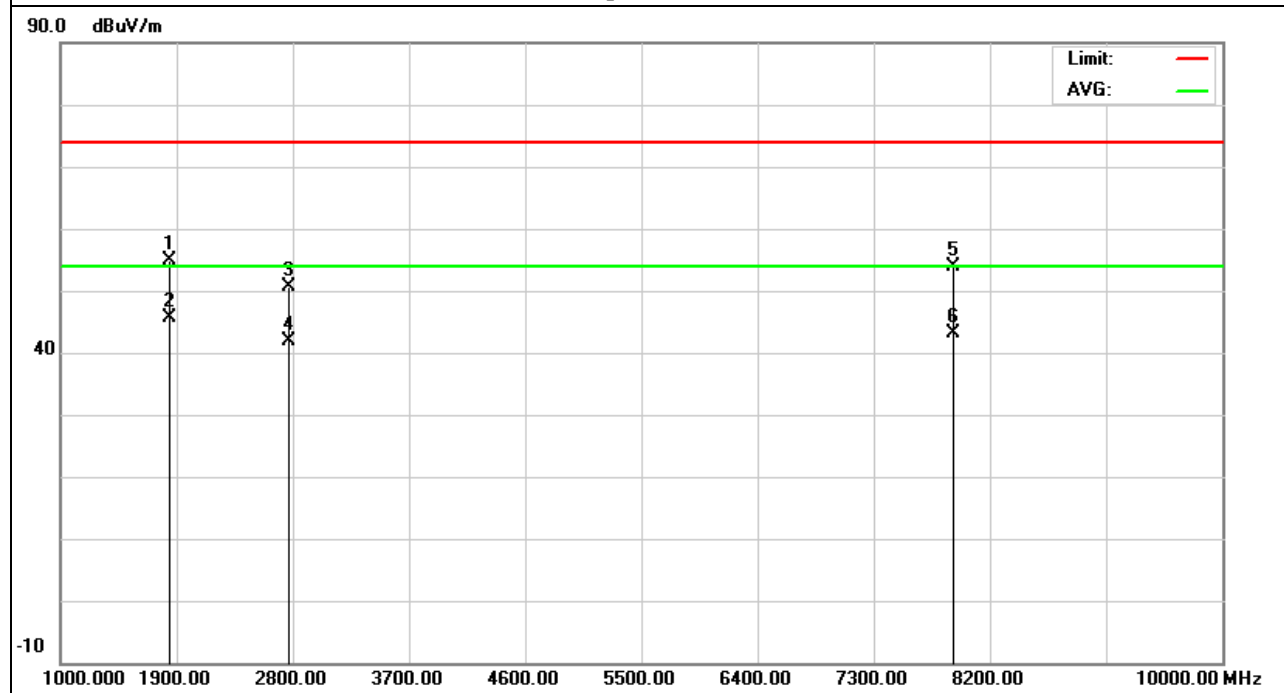


EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2020-11-12
Test Mode :	Mode 2(924.8MHz)	Polarization :	Horizontal
Test Power :	DC25.2V from battery		

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1849.60	64.23	-9.43	54.8	74.00	-19.2	peak
1849.60	55.07	-9.43	45.64	54.00	-8.36	AVG
2774.40	53.66	-3.03	50.63	74.00	-23.37	peak
2774.40	44.86	-3.03	41.83	54.00	-12.17	AVG
7921.00	43.79	10.05	53.84	74.00	-20.16	peak
7921.00	33.12	10.05	43.17	54.00	-10.83	AVG

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Remark:

All the modes had been tested, but only the worst data recorded in the report.

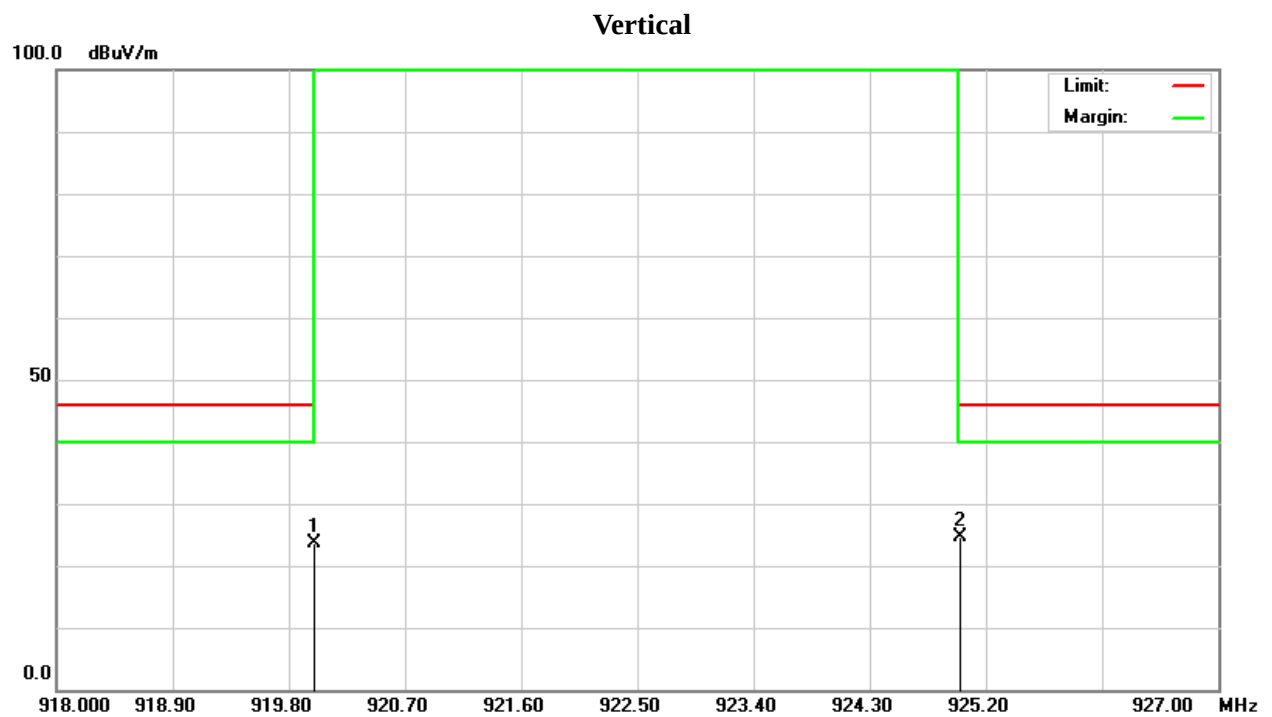
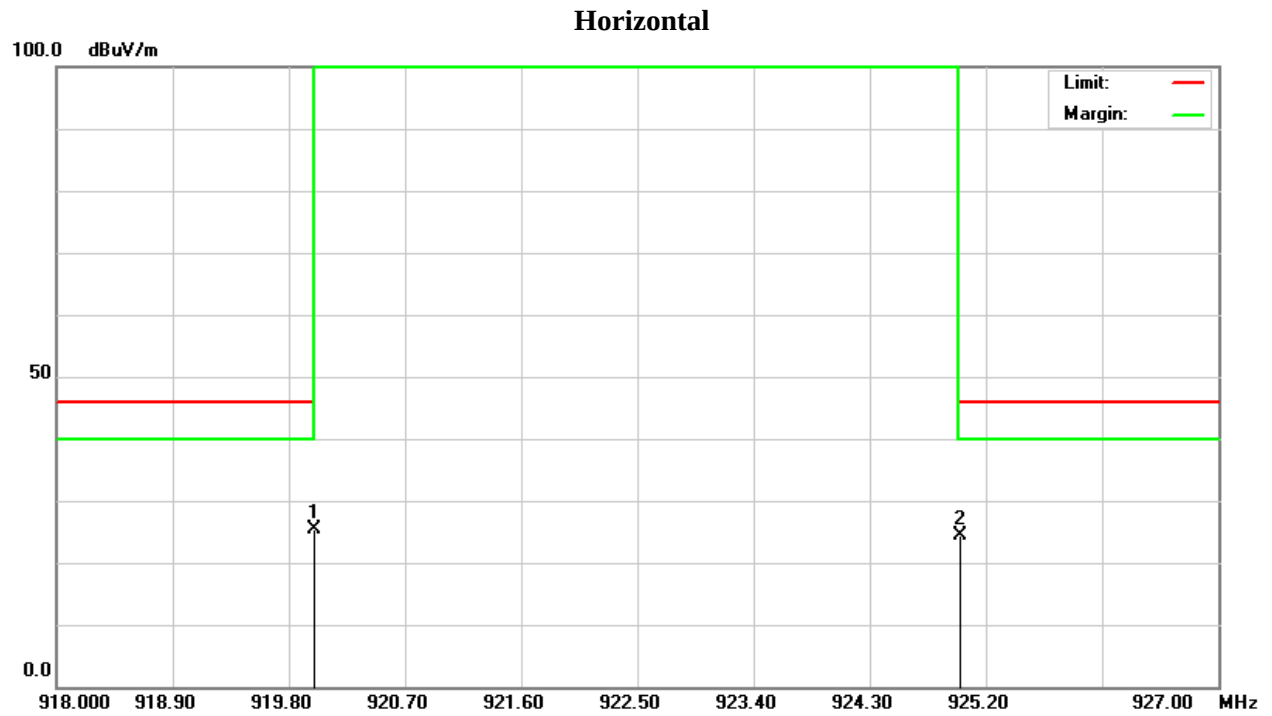
No any other emissions detected which are tested to compliance with the limit. No recording in the test report.

Test result: The unit does meet the NCC requirements.

3.2.8 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC25.2V from battery
Test Mode :	Mode 1(920.2MHz)		
Test Date :	2020-11-12		
Note :	1. The transmitter was setup to transmit at the lowest channel (CH00). Then the field strength was measured at 920-925 MHz. 2. The transmitter was setup to transmit at the highest channel (CH23). Then the field strength was measured at 920-925 MHz.		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant/CF CF(dB)	Act		Limit		Note
		Peak (dBuv)	AV (dBuv)		Peak (dBuv/m)	AV (dBuv/m)	Peak (dBuv/m)	AV (dBuv/m)	
920	H	25.33	--	-1.84	23.49	--	46.00	--	CH00
920	V	24.47	--	-1.84	22.63	--	46.00	--	CH00
925	H	24.52	--	-1.78	22.74	--	46.00	--	CH23
925	V	25.85	--	-1.78	24.07	--	46.00	--	CH23



Test result: The unit does meet the NCC requirements.

4. OCCUPIED BANDWIDTH TEST

4.1 APPLIED PROCEDURES / LIMIT

LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
4.8.1.5	Bandwidth	N/A	920-925	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	10 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW= 10KHz, VBW=30KHz, Sweep time = Auto.

4.1.2 TEST SETUP



4.1.3 EUT OPERATION CONDITIONS

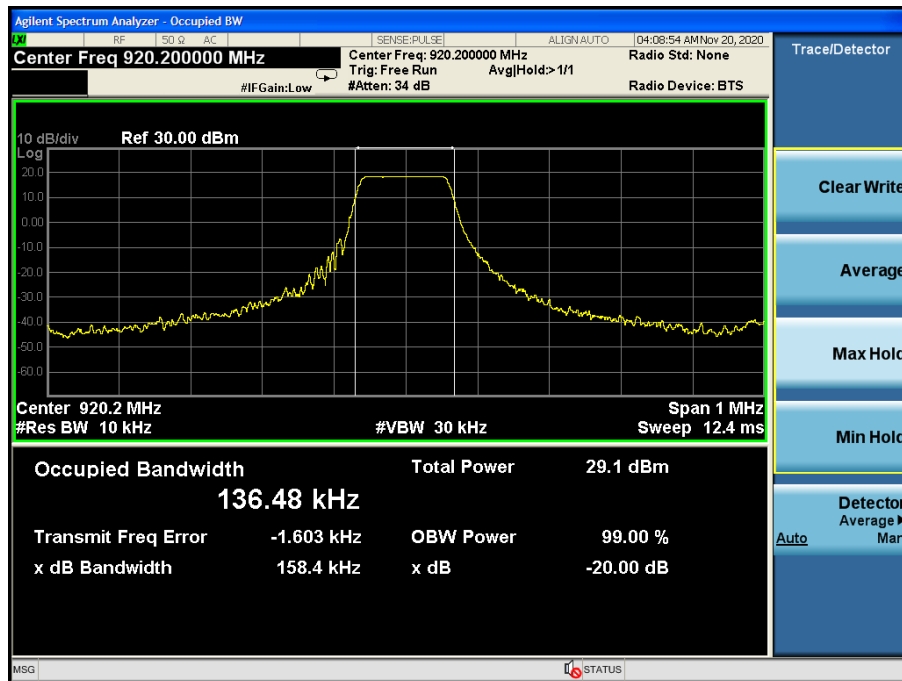
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.4 TEST RESULTS

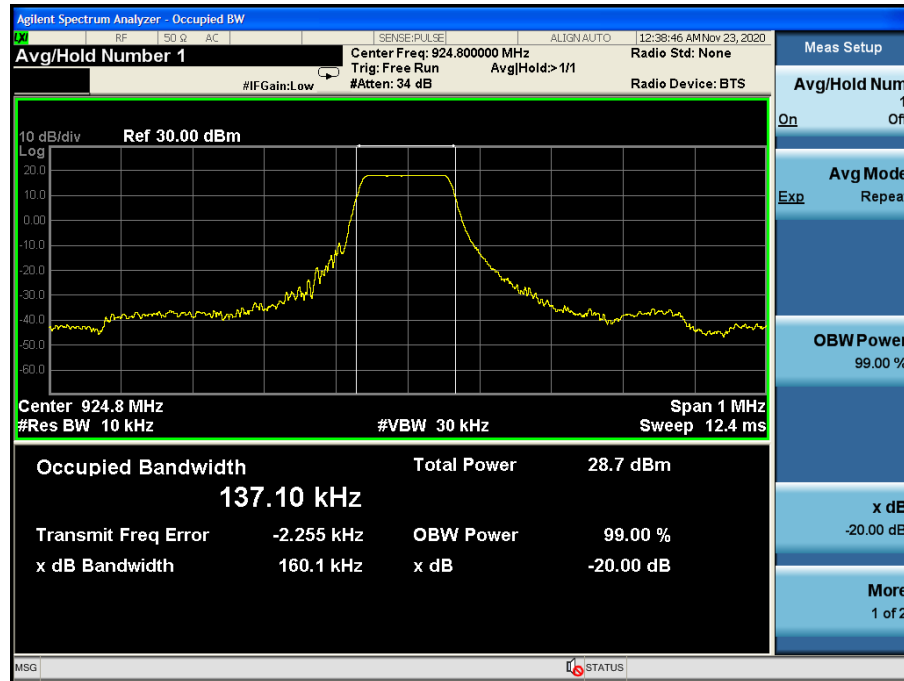
EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC25.2V from battery
Test Mode :	CH00 / CH23		
Test Date :	2020-11-20/23		

Frequency	20dB Bandwidth (kHz)	Result
920.2	158.4	Pass
924.8	160.1	Pass

CH 00



CH 23



5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

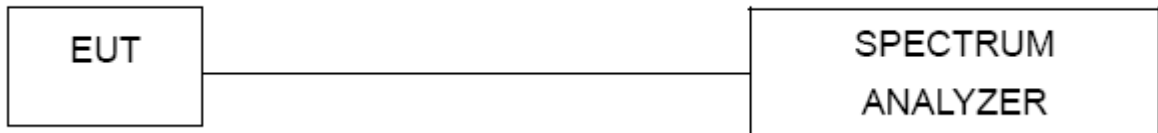
LP0002			
Section	Test Item	Frequency Range (MHz)	Result
4.8.1.5	Number of Hopping Channel	920-925	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	51kHz
VB	150kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 51KHz, VBW=150kHz, Sweep time = Auto.

5.1.2 TEST SETUP



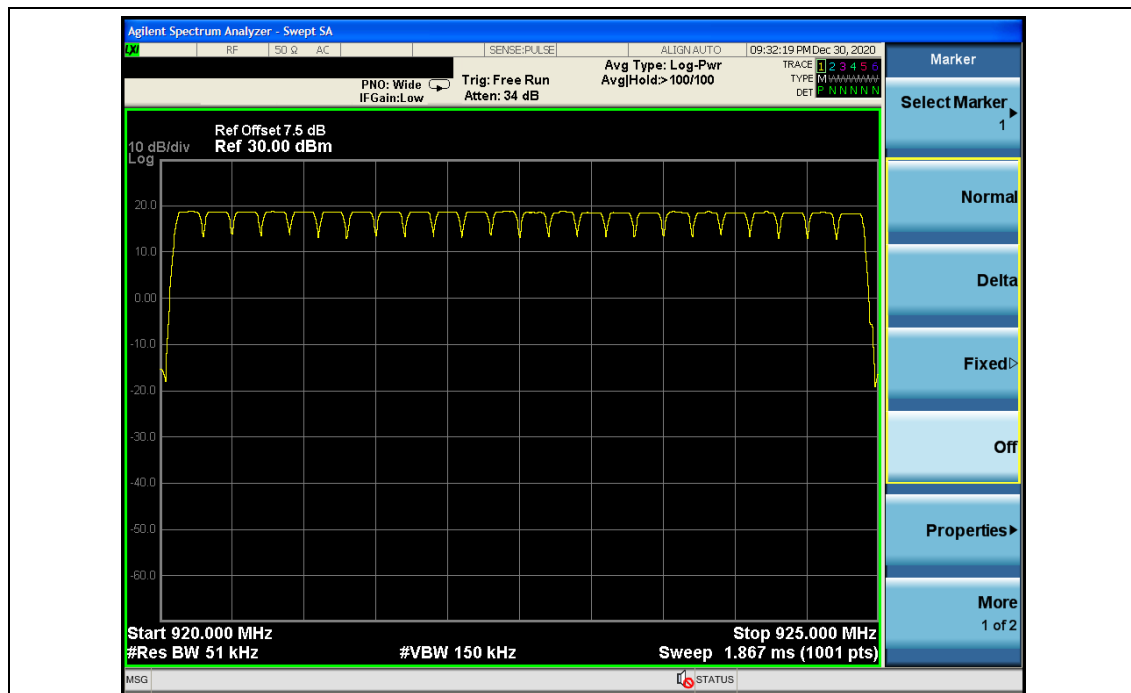
5.1.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.4 TEST RESULTS

EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC25.2V from battery
Test Mode :	Hopping Mode		
Test Date :	2020-11-20		

Number of Hopping Channel	24
---------------------------	----



6. AVERAGE TIME OF OCCUPANCY

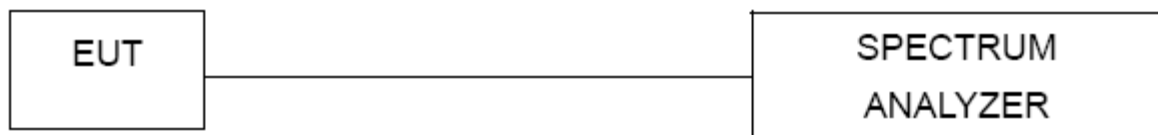
6.1 APPLIED PROCEDURES / LIMIT

LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
4.8.1.5	Average Time of Occupancy	0.4sec	920-925	PASS

6.1.1 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.

6.1.2 TEST SETUP



6.1.3 EUT OPERATION CONDITIONS

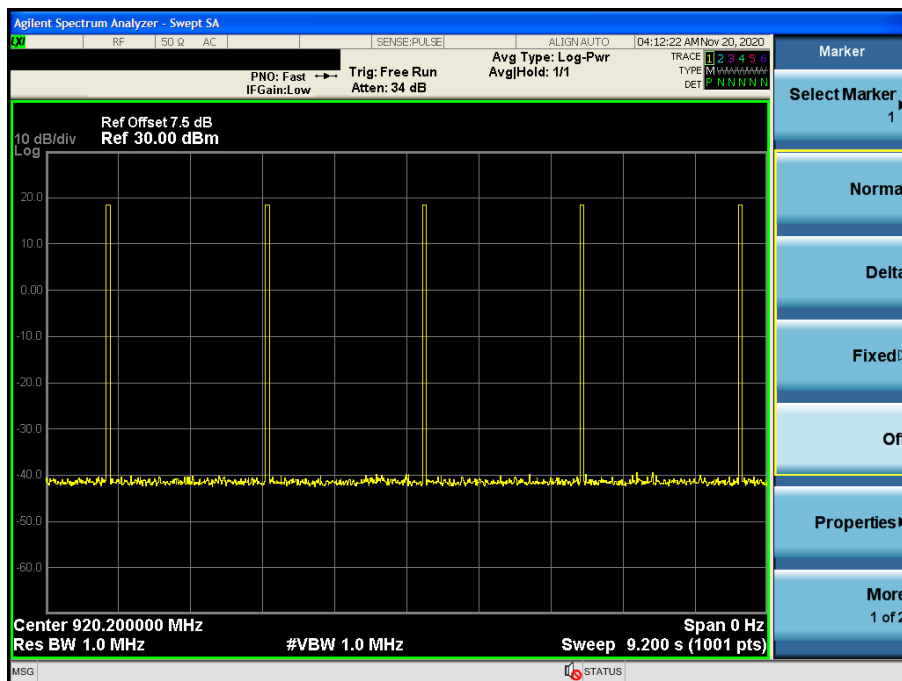
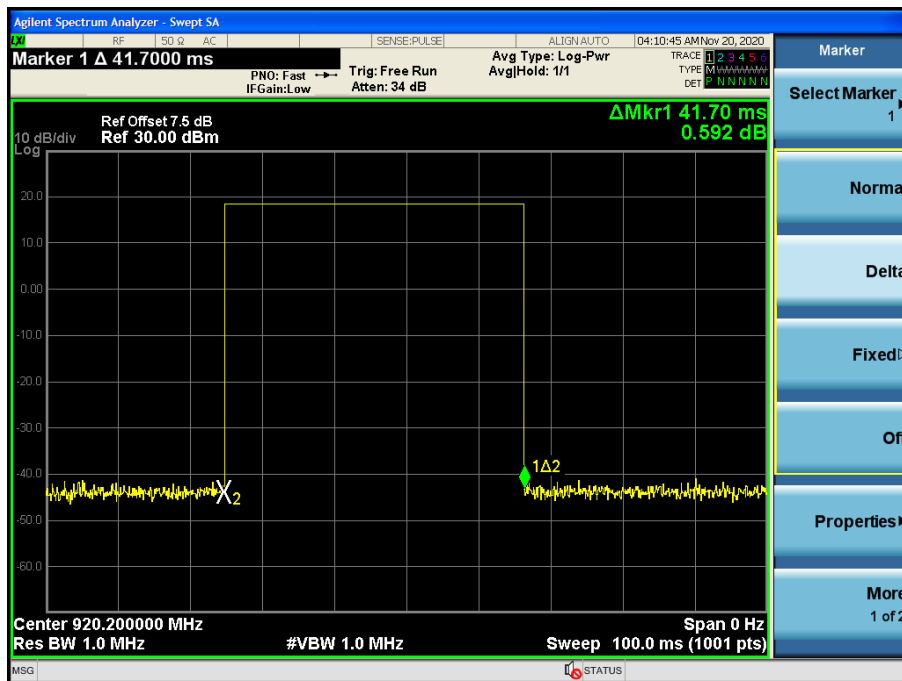
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.4 TEST RESULTS

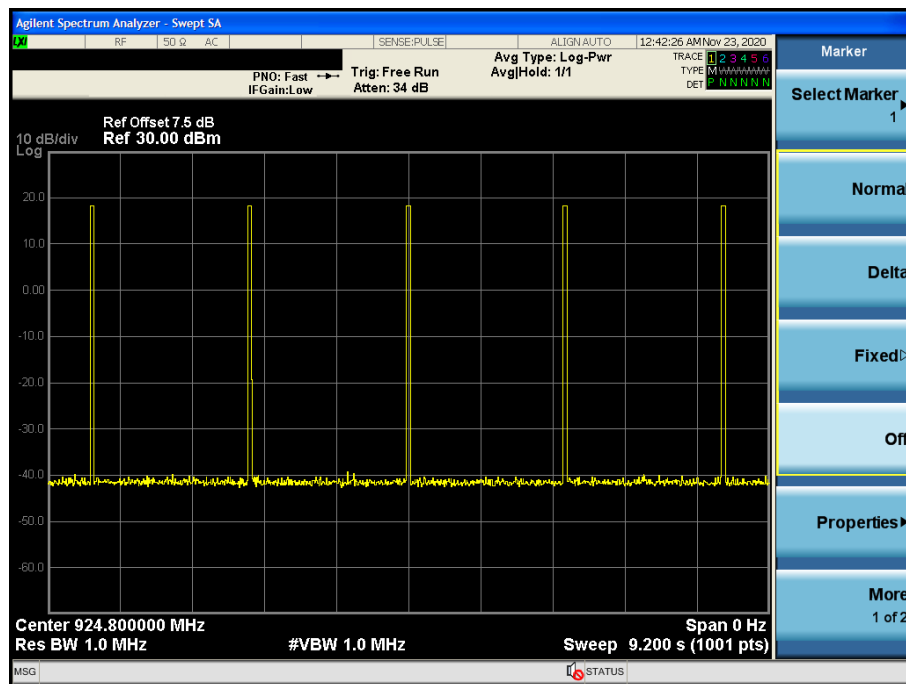
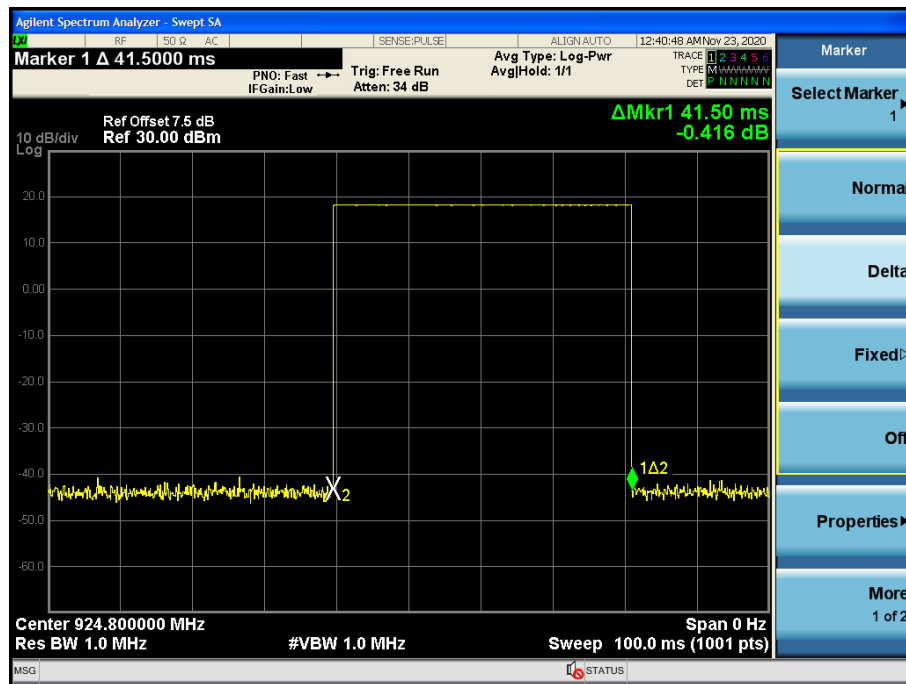
EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC25.2V from battery
Test Mode :	CH00/CH23		
Test Date :	2020-11-20/23		

Frequency	Pulse Duration (ms)	Dwell Time (ms)	Limits (ms)
920.2	41.70	208.5	400
924.8	41.50	207.5	400

CH 00



CH 00



Note:

1. $41.70 \times 5 = 208.5$ ms; $41.50 \times 5 = 207.5$ ms

2. $0.4 \times 23 = 9.2$ s 時間內, ton 的時間小於 0.4 秒

6.1.5. HOPPING CHANNEL SEPARATION MEASUREMENT

6.2 APPLIED PROCEDURES / LIMIT

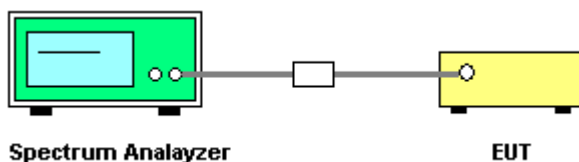
Frequency hopping systems operating in the 920-925 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	10 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

6.2.1 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- The resolution bandwidth of 10 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- The resolution bandwidth of 30 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

6.2.2 TEST SETUP



6.2.3 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.2.4 TEST RESULTS

EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC25.2V from battery
Test Mode :	CH00 / CH23		
Test Date :	2020-11-20/23		

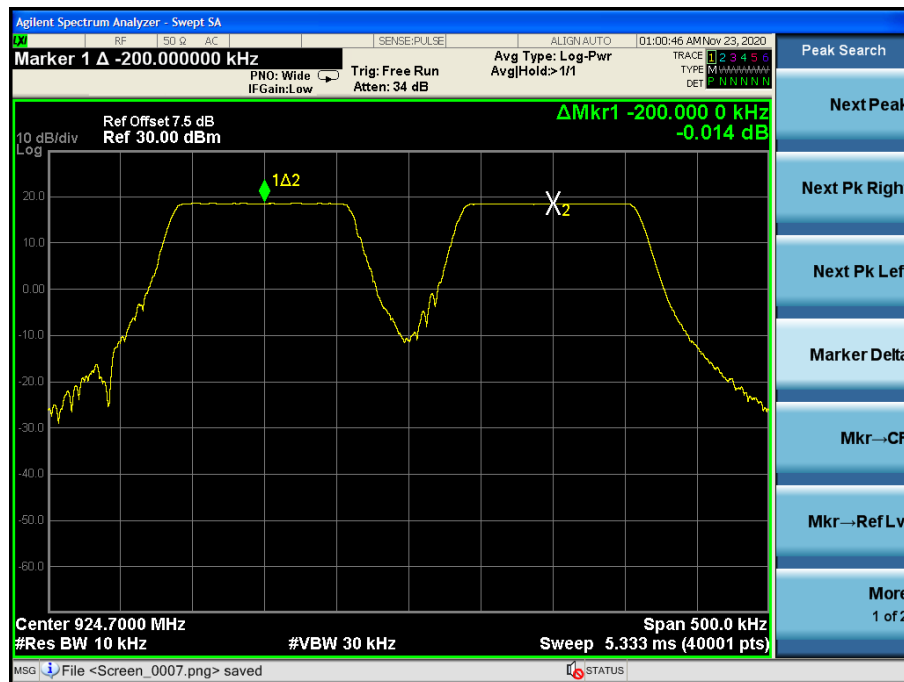
Frequency MHz	Ch. Separation (KHz)	Limit (20dB bandwidth) (kHz)	Result
920.2	200	158.4	PASS
924.8	200	160.1	PASS

Ch. Separation >(20dB bandwidth)

CH 00



CH 23



7. PEAK OUTPUT POWER TEST

7.1 APPLIED PROCEDURES / LIMIT

LP0002				
Section	Test Item	Limit	Frequency Range (MHz)	Result
4.1.8.2	Peak Output Power	1 watt or 30dBm	920-925	PASS

7.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : VBW= 30kHz, Sweep time = Auto.
VBW= 100kHz, Sweep time = Auto.

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION CONDITIONS

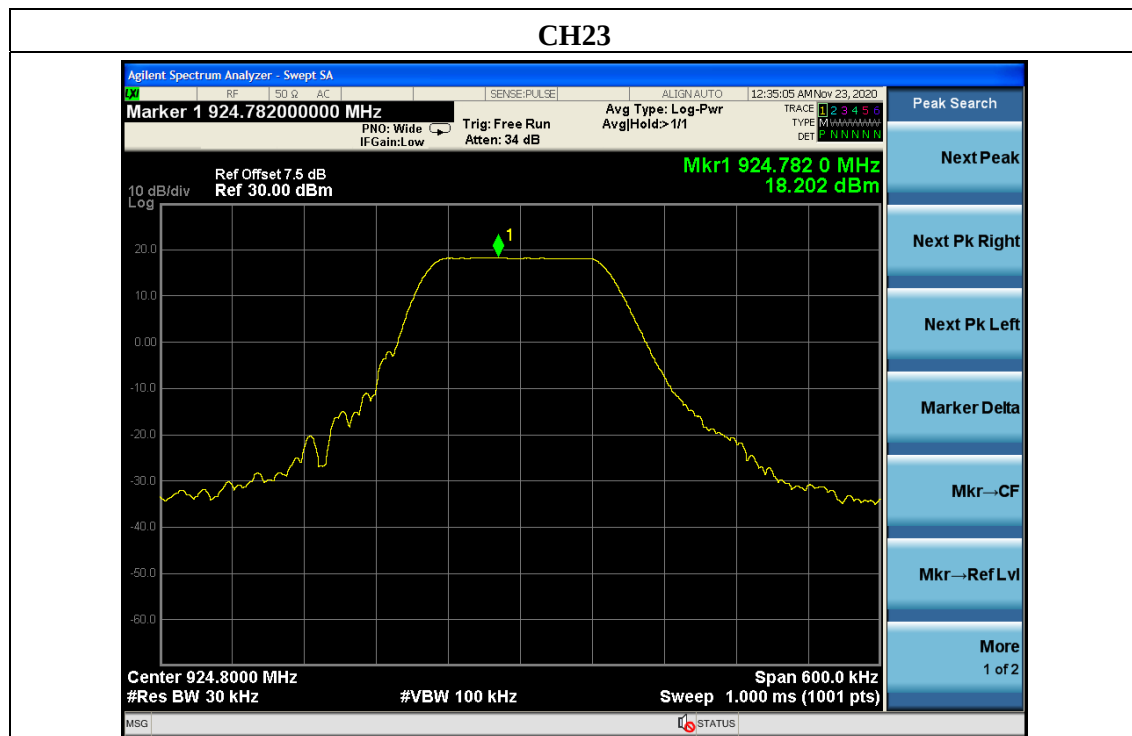
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.1.5 TEST RESULTS

EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC25.2V from battery
Test Mode :	CH00/ CH23		
Test Date :	2020-11-20/23		

Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
920.2	18.540	30
924.8	18.202	30





8. ANTENNA CONDUCTED SPURIOUS EMISSION

8.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency 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 or shall not exceed the general levels specified in Section 2.8.

Frequencies (MHz)	Field Strength (micorvolts/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

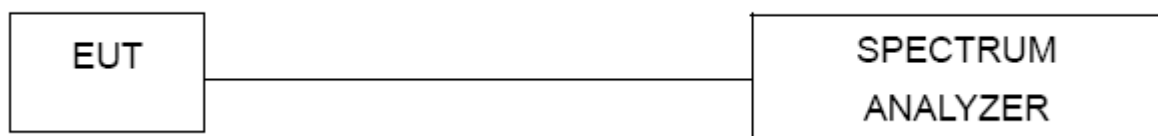
The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	4 MHz
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (other emission)	100 KHz /300 KHz for Peak

8.1.1 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

8.1.2 TEST SETUP



8.1.3 EUT OPERATION CONDITIONS

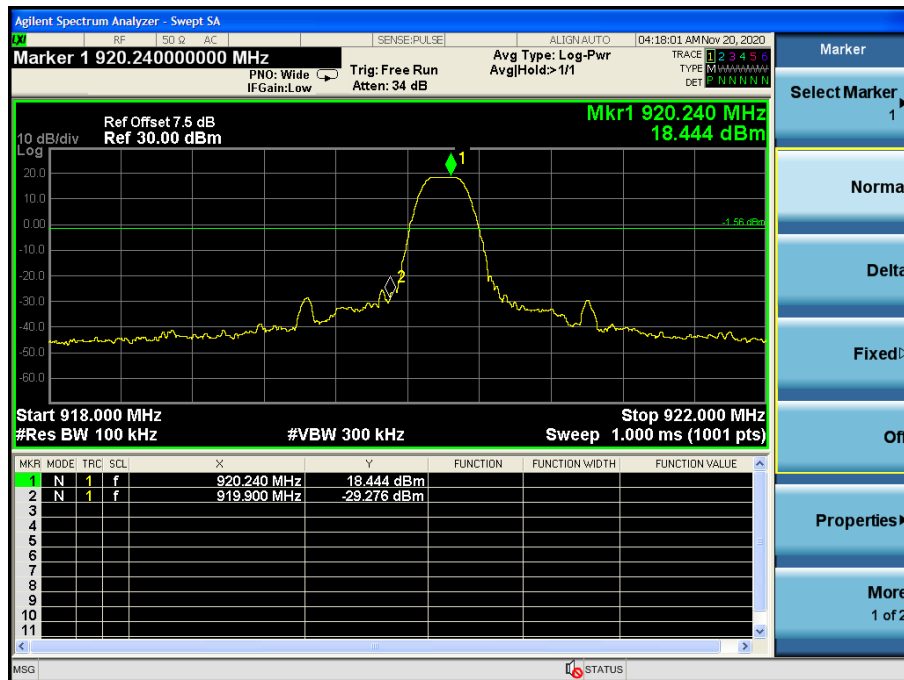
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.4 TEST RESULTS

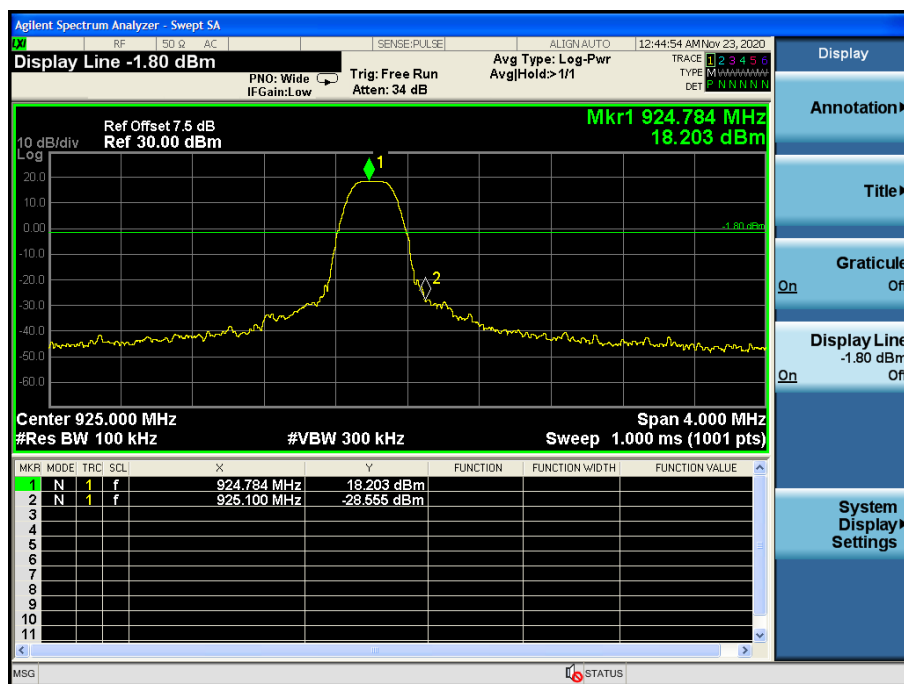
EUT :	好啦機器人 HolaBot	Model Name :	HL100
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC25.2V from battery
Test Mode :	CH00 / CH23		
Test Date :	2020-11-20/23		

in any 100kHz bandwidth outside the low frequency band	in any 300 kHz bandwidth outside the high frequency band
Pass	Pass
Result	
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 300kHz bandwidth within the band that contains the highest level of the desired power.	

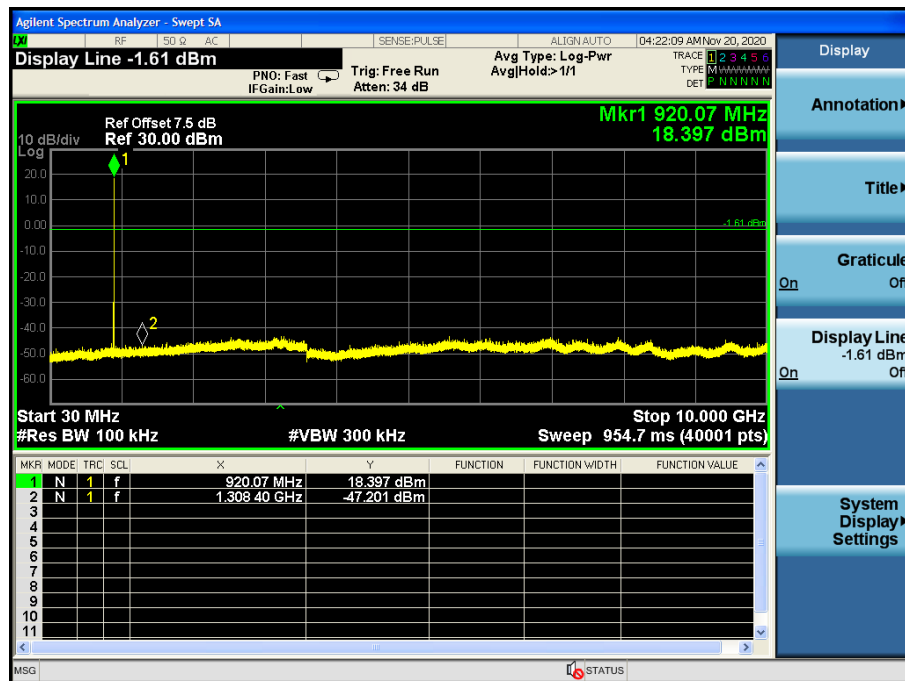
CH00



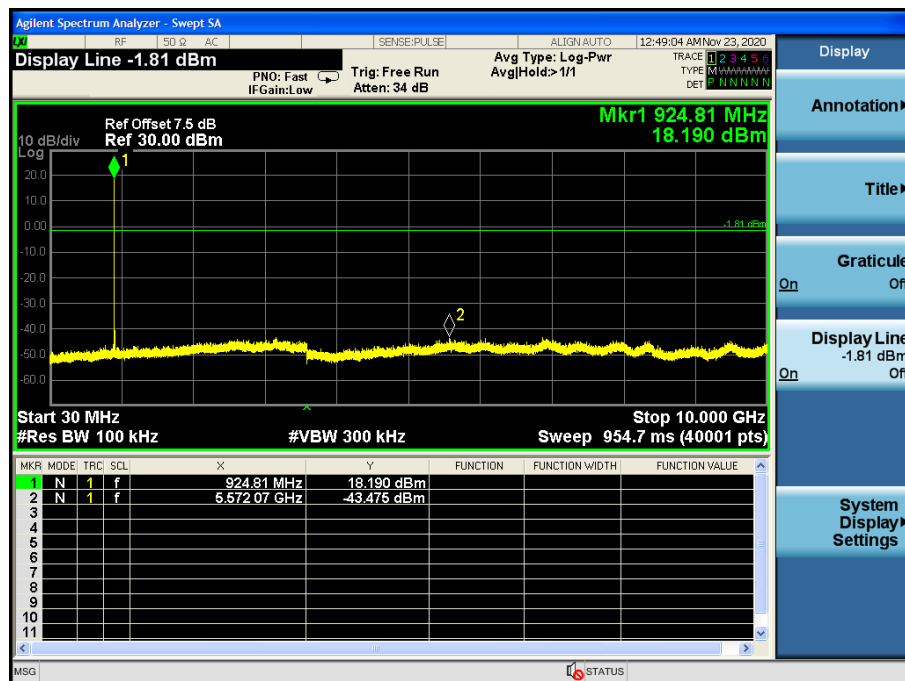
CH 23



CH00



CH23



10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

3.10.3.1.1 requirement: Systems operating in the 920-925 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

10.2 EUT ANTENNA

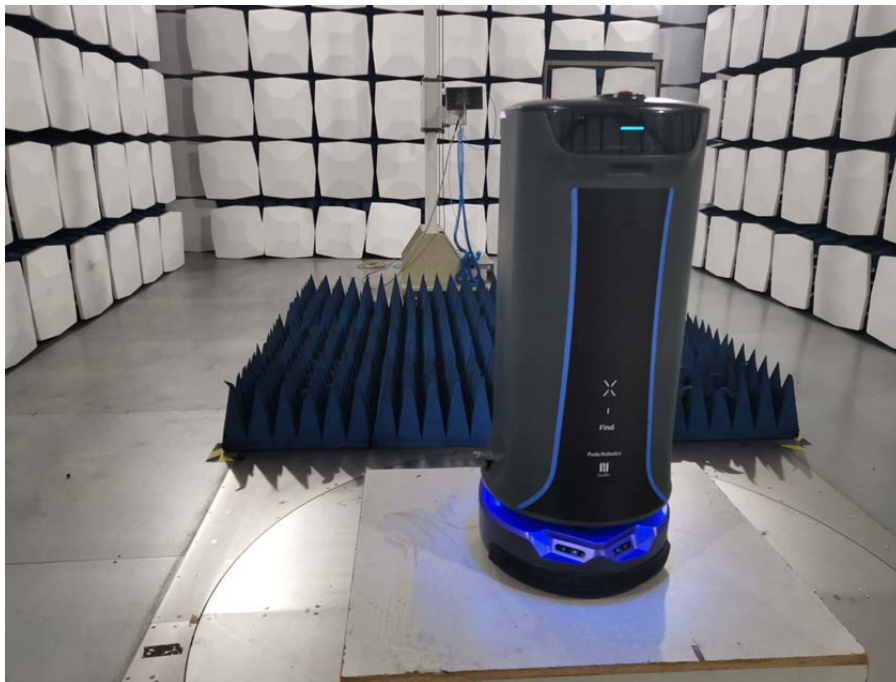
The antenna is a PCB antenna and no consideration of replacement. Antenna max gain is 2.5dBi from 920MHz to 925MHz.

11. EUT TEST PHOTO

**Radiated Measurement Photos
30MHz-1GHz**



**Radiated Measurement Photos
Above 1GHz**



Conducted Measurement Photos

End of the report