

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 : 11-30-2020

Signature :



NCC RADIO TEST REPORT

Report Reference No...... M201118N2

Compiled by (+ signature) Kevin Bothmann

Approved by (+ signature) Jay Gandhi

Date of issue..... 2020-11-30

Applicant's name 深圳市普渡科技有限公司

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

Manufacture's Name 深圳市普渡科技有限公司

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

Brand name 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.

Address 1547 Plymouth Street, Mountain View, CA 94043

CAB Identifier Number US0036

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Testing.....

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

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

Date of Issue Nov. 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)	A-0118
	Open Field Test Site "A"	-
	Mains Conducted Emissions Test Site "A"	-
	Telecom Conducted Emissions Test Site "A"	-
	3 Meter Semi-Anechoic Chamber Site "E"	-
	3 Meter Semi-Anechoic Chamber Site "E" (1GHz – 6GHz)	-
	Mains Conducted Emissions Test Site "E"	-
	Telecom Conducted Emissions Test Site "E"	-
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. MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
RF frequency	$\pm 1 \cdot 10^{-5}$
RF power conducted	$\pm 1,5 \text{ dB}$
RF power radiated	$\pm 6 \text{ dB}$
Spurious emissions, conducted	$\pm 3 \text{ dB}$
Spurious emissions, radiated	$\pm 6 \text{ dB}$
Humidity	$\pm 5 \%$
Temperature	$\pm 1^\circ\text{C}$
Time	$\pm 10 \%$

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

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	好啦機器人HolaBot	
Brand Name	Pudu	
Model Name	HL100	
Serial Model Name	N/A	
OEM Brand/Model Name	N/A	
Product Description	The EUT is a 好啦機器人HolaBot.	
	Operation Frequency:	5.25GHz-5.35GHz 5.47GHz-5.725GHz
	Modulation Type:	IEEE for 802.11a: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE for 802.11n: OFDM (BPSK/QPSK/16QAM/64QAM) IEEE for 802.11ac:OFDM (QPSK/BPSK/16QAM/64QAM/25 6QAM)
	Number Of Channel	Please see Note 2.
	Antenna Designation:	PCB Antenna
	Antenna Gain(Peak)	3.5dBi
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) " N/A" denotes test is not applicable in this Test Report. (2)

Reference to the C63.10:2013.

(3) Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 Radiated testing was performed at an antenna to EUT distance 3 meters. The tests documented in this report were performed in accordance with ANSI C63.4: 2014 and LP0002:2018, FCC CFR 47 Part 15.207, 15.209, 15.407 and FCC 14-30, IC RSS-247, Radio testing was performed according to KDB DA 02-2138KDB 789033 D02KDB 905462 D02, KDB 905462 D03, KDB 905462 D06 .

(4)For a more detailed features description, please refer to the manufacturer's specifications or theUser's Manual

2. Channel List

802.11a/n/ac(20MHz) (5.25-5.35GHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	56	5280	60	5300	64	5320
802.11a/n/ac(20MHz) (5.47-5.725GHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	104	5520	108	5540	112	5560
116	5580	120	5580	124	5620	128	5640
132	5660	136	5680	140	5700	-	-
802.11n/ac(40MHz) (5.25-5.35GHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310	-	-	-	-
802.11n/ac(40MHz) (5.47-5.725GHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	110	5550	118	5590	126	5630
134	5670	-	-	-	-	-	-
802.11 ac(80MHz) (5.25-5.35GHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
58	5290	-	-	-	-	-	-
802.11 ac(80MHz) (5.47-5.725GHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
106	5530	-	-	-	-	-	-

3. Table for Filed Antenna

Ant	Manufacture	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	Shenzhen eyebook Technology Co., Ltd	PJ0003_Ant0003	PCB Antenna	N/A	3.5dBi	Antenna

2.2 DESCRIPTION OF TEST MODES

The EUT is a 2TX configuration without beam forming function.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

IEEE 802.11ac 80: 5290 MHz

Channel (5290MHz) with 27Mbps data rate was chosen for the final testing.

IEEE 802.11ac 80: 5530 MHz

Channel (5530MHz) with 27Mbps data rate was chosen for the final testing.

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.

Test software Version	Test program: CMD		
Frequency	5260 MHz	5300 MHz	5320 MHz
Frequency	5500 MHz	5580 MHz	5700 MHz
Frequency	5270 MHz	5310 MHz	-
Frequency	5510 MHz	5550 MHz	5670 MHz
Frequency	5290 MHz	5530 MHz	-

2.3.1 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

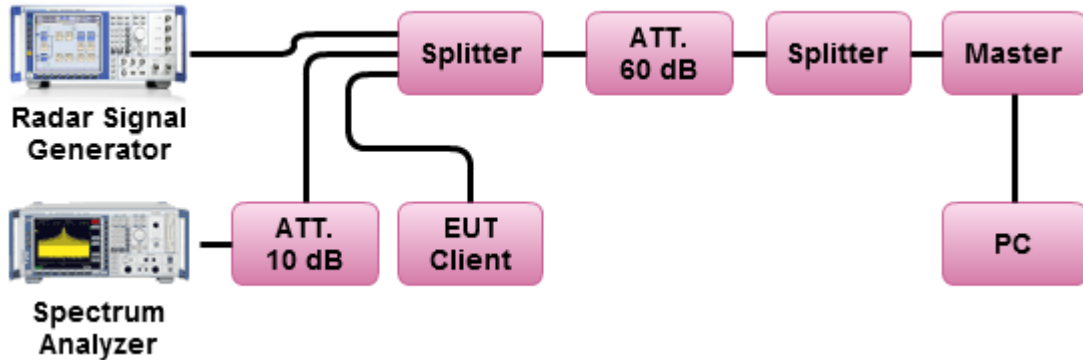
EMI Test Equipment (Continued)

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 DFS MEASUREMENT SYSTEM:

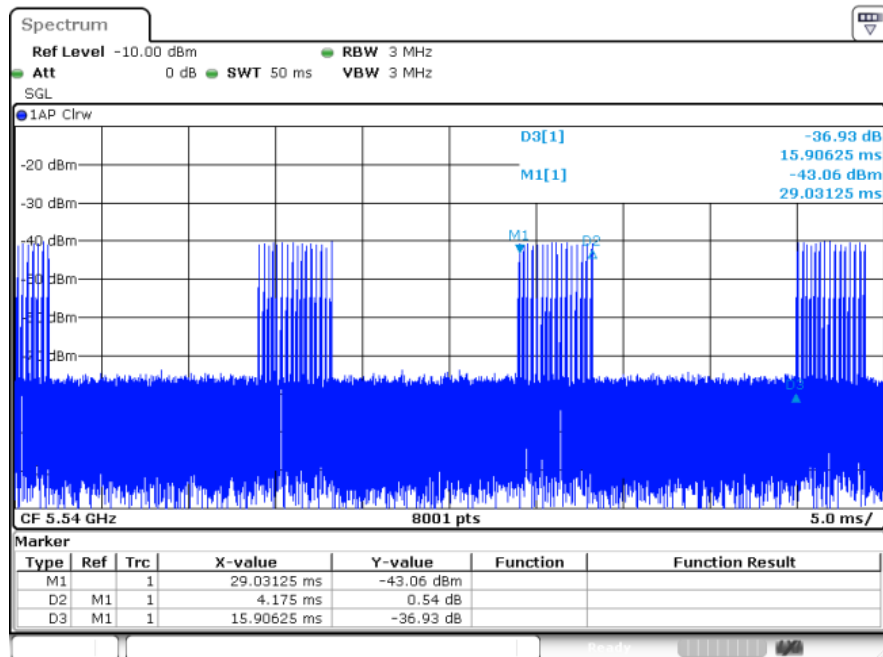
CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



Channel Loading/Data Streaming

☒ IP Based (Load Based) -stream the test file from the Master to the Client.	
☐	The data file must be of a type that is typical for the device (i.e., MPEG-2, MPEG-4, WAV, MP3, MP4, AVI, etc.) and must generally be transmitting in a streaming mode.
☒	Minimum channel loading of approximately 17 %

VHT80 Channel Loading: 26.25%



4. TEST RESULTS**4.1 SUMMARY OF TEST RESULT**

FCC Rules		Description of Test	Result
FCC 15.407	KDB 905462 D02	Non-Occupancy Period	Pass
FCC 15.407	KDB 905462 D02	Channel Closing Transmission Time	Pass
FCC 15.407	KDB 905462 D02	Channel Move Time	Pass

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

5 TEST MODE DFS TEST RESULT

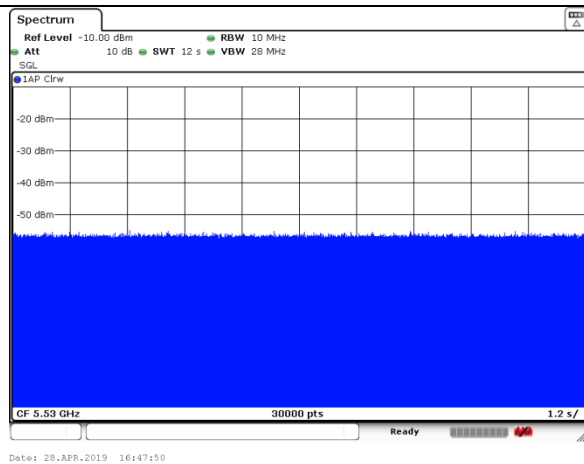
5.1 DFS DETECTION THRESHOLD LEVELS

Master DFS Threshold Level

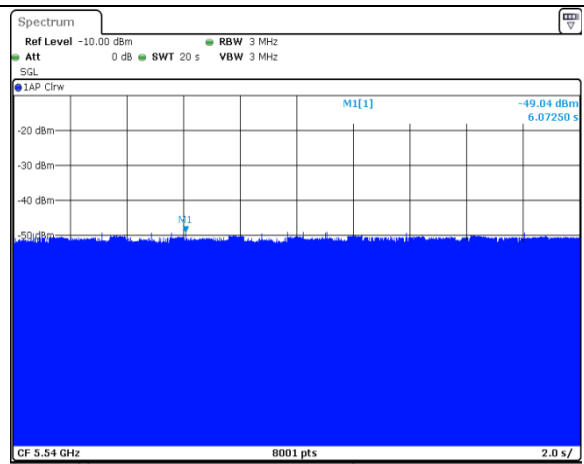
DFS Threshold level:-60.05dBm

The Interference Radar Detection Threshold Level is $(-62\text{dBm}) + ([1.0\text{dB}]) + \{1\text{dB}\} = -60.00\text{dBm}$. That has been taken into account the master output power range and antenna gain.

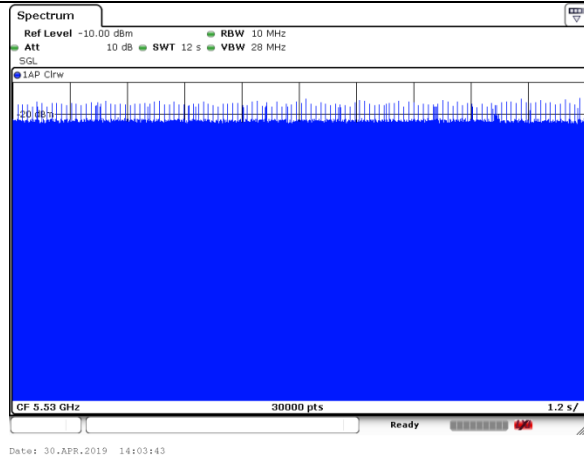
Without Data Traffic Plot (Noise Plot)



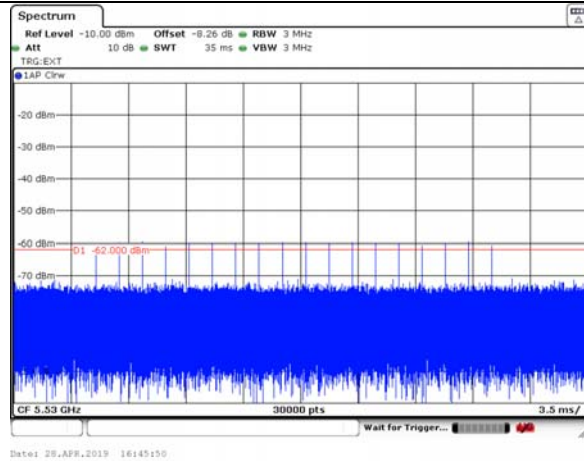
Master Data Traffic Plot



Client(EUT) Data Traffic Plot



Calibration Radar # 0 detection threshold level



5.2 CHANNEL MOVE TIME, CHANNEL CLOSING TRANSMISSION TIME AND NON-OCCUPANCY PERIOD FOR CLIENT BEACON TEST PLOTS

In-service Monitoring Limit

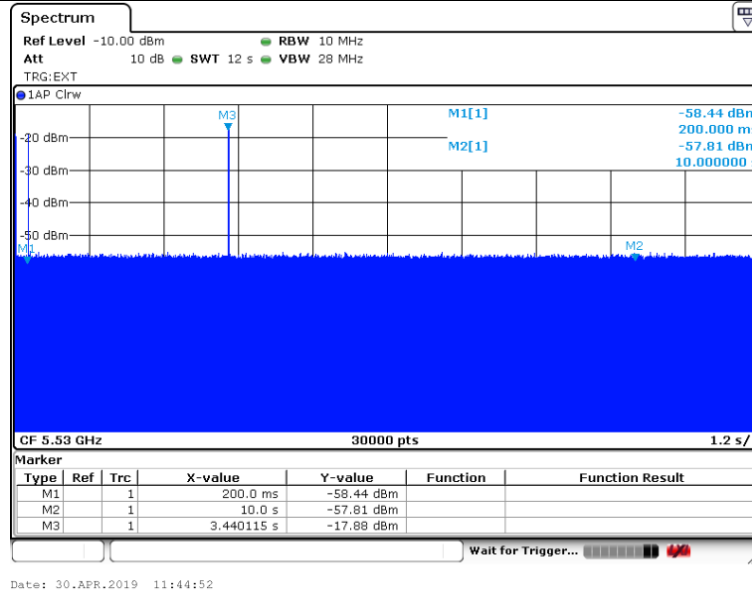
In-service Monitoring Limit	
Channel Move Time	10 sec
Channel Closing Transmission Time	200 ms+ an aggregate of 60 ms over remaining 10 sec periods.
Non-occupancy period	Minimum 30 minutes

Test Procedures

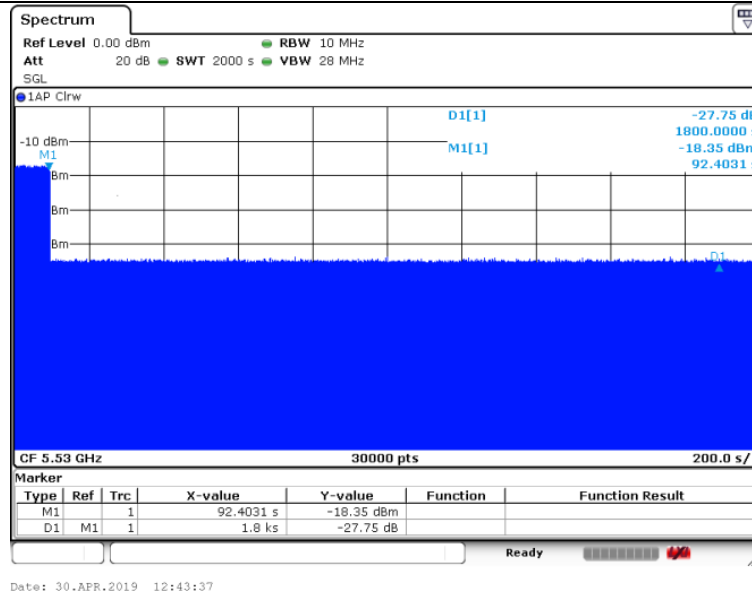
Test Method
Refer as FCC KDB 905642 D02, clause 7.8.3 verified during In-Service Monitoring; Channel Closing Transmission Time, Channel Move Time. Client Device will associate with the EUT. Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Compare the Channel Move Time and Channel Closing Transmission Time limits.
Refer as FCC KDB 905642 D02, clause 7.8.3 verified during In-Service Monitoring; Non-Occupancy Period. Client Device will associate with the EUT. Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Non-Occupancy Period). Compare the Non-Occupancy Period limits.

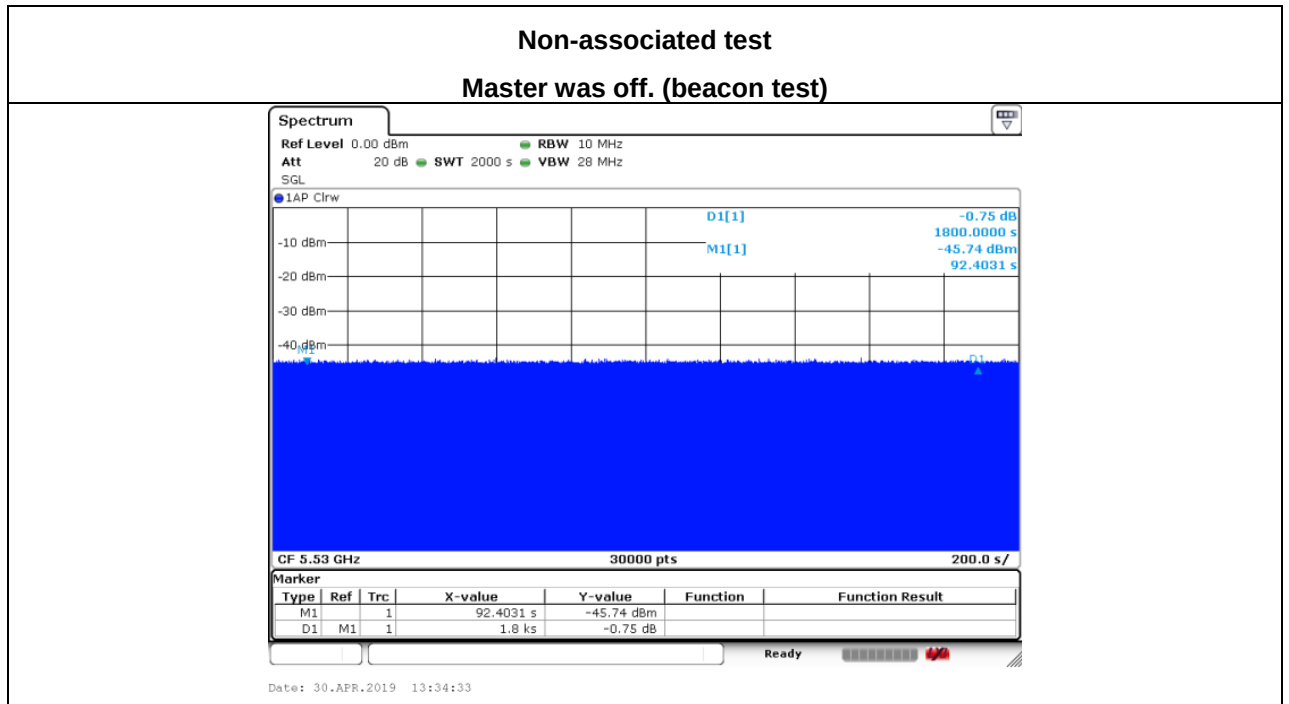
Test Result of Channel Closing Transmission and Channel Move Time

Channel Move Time & Channel Closing Transmission Time



Non-Occupancy Period





Note:

Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)

Channel Closing Transmission Time (200 + 1.6 ms) = 200 + Number (4) X Dwell (0.4 ms) < 260ms.

6 APPENDIX-Photographs of EUT Constructional Details

Please refer to **APPENDIX**.

****End of the report****