



MEASUREMENT REPORT

FCC PART 15.225 / RSS 210 NFC 13.56MHz

FCC ID: HD5-CT40L0N

IC: 1693B-CT40L0N

APPLICANT: Honeywell International Inc
Honeywell Safety and Productivity Solutions

Application Type: Certification

Product: DOLPHIN CT40

Model No.: CT40-L0N

Brand Name: Honeywell

FCC Classification: Part 15 Low Power Communication Device Transmitter (DXX)

FCC Rule Part(s): Part 15.225

IC Rule(s): RSS 210 Issue 9, RSS-GEN Issue 5

Test Procedure(s): ANSI C63.10-2013

Test Date: April 18 ~ June 27, 2018

Reviewed By :

Jame Yuan

(Jame Yuan)

Approved By :

Robin Wu

(Robin Wu)



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1804RSU010-U6	Rev. 01	Initial report	06-27-2018	Valid

CONTENTS

Description	Page
§2.1033 General Information	5
1. INTRODUCTION	6
1.1. Scope	6
1.2. MRT Test Location	6
2. PRODUCT INFORMATION	7
2.1. Equipment Description.....	7
2.2. Test Mode	7
2.3. Device Capabilities	7
2.4. Test Configuration	7
2.5. EMI Suppression Device(s)/Modifications	8
2.6. Labeling Requirements.....	8
3. DESCRIPTION OF TEST	9
3.1. Evaluation Procedure	9
3.2. AC Line Conducted Emissions	9
3.3. Radiated Emissions.....	10
4. ANTENNA REQUIREMENTS.....	11
5. TEST EQUIPMENT CALIBRATION DATA	12
6. MEASUREMENT UNCERTAINTY.....	13
7. TEST RESULT	14
7.1. Summary	14
7.2. In-band Emission.....	15
7.2.1. Test Limit	15
7.2.2. Test Procedure Used	15
7.2.3. Test Setup.....	16
7.2.4. Test Result.....	17
7.3. Out-band Emission	18
7.3.1. Test Limit	18
7.3.2. Test Procedure Used	18
7.3.3. Test Setup.....	19
7.3.4. Test Result.....	20
7.4. 20dB Bandwidth	21
7.4.1. Test Limit	21
7.4.2. Test Procedure Used	21

7.4.3.	Test Setup.....	21
7.4.4.	Test Result.....	22
7.5.	Frequency Tolerance.....	23
7.5.1.	Test Limit	23
7.5.2.	Test Procedure Used	23
7.5.3.	Test Setup.....	23
7.5.4.	Test Result.....	24
7.6.	AC Conducted Emissions Measurement.....	25
7.6.1.	Test Limit	25
7.6.2.	Test Setup.....	25
7.6.3.	Test Result.....	26
8.	CONCLUSION.....	28

§2.1033 General Information

Applicant:	Honeywell International Inc Honeywell Safety and Productivity Solutions
Applicant Address:	9680 Old Bailes Road, Fort Mill, SC 29707 United States
Manufacturer:	Honeywell International Inc Honeywell Safety and Productivity Solutions
Manufacturer Address:	9680 Old Bailes Road, Fort Mill, SC 29707 United States
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT FCC Registration No.:	893164
MRT IC Registration No.:	11384A-1
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.



1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	DOLPHIN CT40
Model No.:	CT40-L0N
Brand Name:	Honeywell
Hardware Version:	1.0
Software Version:	OS.01.008
Wi-Fi Specification:	802.11a/b/g/n/ac
Bluetooth Version:	v5.0 dual mode
NFC:	13.56MHz
Accessories	
USB Adapter:	Model No.: ADS-12B-06 05010E Input Power: 100 - 240V ~ 50/60Hz, Max. 0.3A Output Power: 5VDC 2.0A
Snap-on Adapter:	Model No.: CT40-SN
Battery:	Model No.: CT50-BTSC Capacitance: 15.5Wh, 4090mAh Rated Voltage: 3.8V Limit Charge Voltage: 4.36V

2.2. Test Mode

Test Mode
Mode 1: Transmit by NFC

2.3. Device Capabilities

This device contains the following capabilities:

2.4GHz WLAN (DTS), 5GHz WLAN (UNII) and Bluetooth (v5.0 dual mode), NFC

2.4. Test Configuration

The **DOLPHIN CT40 FCC ID: HD5-CT40L0N** was set to continuous transmission. This was performance using manufacturer software loaded on the terminal to allow for continuous transmission. This device was tested in accordance with the guidance of ANSI C63.10-2013. ANSI C63.4-2009 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.5. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.6. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase.

However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

RSP-100 Issue 11 Section 3

The manufacturer, importer or distributor shall meet the labelling requirements set out in this section for every unit:

- (i) prior to marketing in Canada, for products manufactured in Canada
- (ii) prior to importation into Canada, for imported products

For information regarding the e-labelling option, see Notice 2014-DRS1003. The label for the certified product represents the manufacturer's or importer's compliance with Innovation, Science and Economic Development Canada's (ISED) regulatory requirements.

Please see attachment for IC label and label location.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013) was used in the measurement of the **DOLPHIN CT40 FCC ID: HD5-CT40L0N**.

Deviation from measurement procedure.....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50 Ω /50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013 at Clause 4.3.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antenna of the DOLPHIN CT40 is **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The **DOLPHIN CT40** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATA

Conducted Emission - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2018/08/18
Two-Line V-Network	R&S	ENV 216	MRTSUE06002	1 year	2018/06/21
Two-Line V-Network	R&S	ENV 216	MRTSUE06003	1 year	2018/06/21
Thermohygrometer	Testo	608-H1	MRTSUE06404	1 year	2018/08/14
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	N/A	N/A

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Agilent	N9038A	MRTSUE06125	1 year	2018/08/18
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2018/08/18
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2018/11/17
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2018/11/20
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2018/11/18
Broad Band Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2018/10/21
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2018/12/14
Thermohygrometer	Testo	608-H1	MRTSUE06403	1 year	2018/08/14
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2018/05/10
				1 year	2019/05/10

Software	Version	Function
EMI Software	V3	EMI Test Software

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB

7. TEST RESULT

7.1. Summary

Product Name: DOLPHIN CT40

Test Mode: NFC Transmit

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.225(a), (b), (c)	RSS-210 [B.6]	In-Band Emission	15,848uV/m @ 30m 13.553 ~ 13.567 MHz 334uV/m @ 30m 13.410 ~ 13.553 MHz 13.567 ~ 13.710 MHz 106uV/m @ 30m 13.110 ~ 13.410 MHz 13.710 ~ 14.010 MHz	Radiated	Pass	Section 7.2
15.225(d)	RSS-210 [B.6]	Out-Band Emission	Emissions outside of the specified band (13.110~14.010 MHz) must meet the radiated limits detailed in 15.209		Pass	Section 7.3
2.1049	N/A	20dB Bandwidth	N/A		Pass	Section 7.4
15.225(e)	RSS-210 [B.6]	Frequency Stability Tolerance	±0.01% of operating frequency		Pass	Section 7.5
15.207	RSS-Gen [8.8]	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.6

Notes:

- 1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

7.2. In-band Emission

7.2.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.225		
Frequency (MHz)	Distance (m)	Level (uV/m)
13.553 ~13.567	30	15,848
13.410 ~13.553 13.567 ~13.710	30	334
13.110 ~13.410 13.710 ~14.010	30	106

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

7.2.2. Test Procedure Used

The EUT was setup according to ANSI C63.4, 2009 and tested according to ANSI C63.10: 2009 for compliance to FCC 47CFR 15.247 requirements.

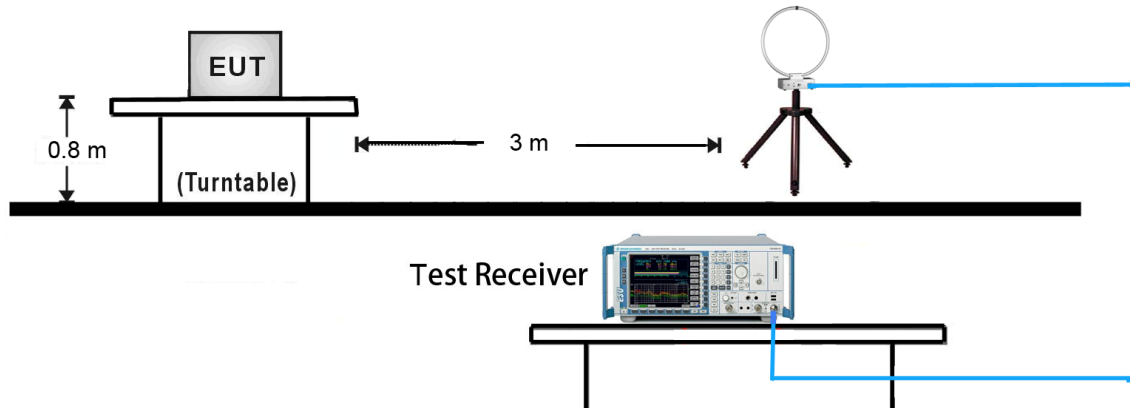
The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 on radiated measurement.

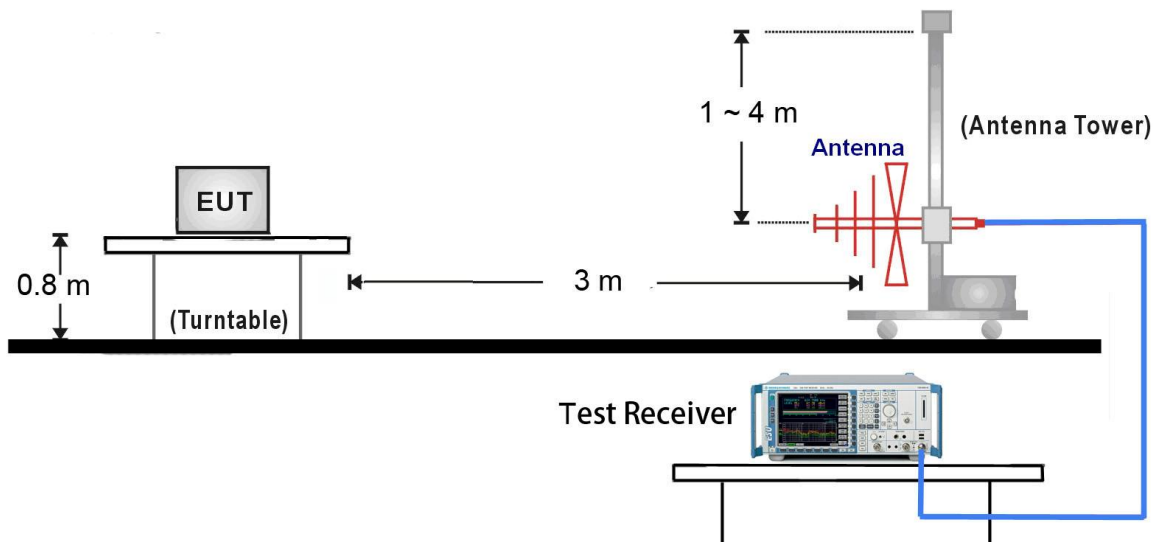
The EUT should be operate in transmission mode.

7.2.3. Test Setup

9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



7.2.4. Test Result

Test Engineer	Snake Ni	Temperature	25°C
Test Time	2018/04/21	Relative Humidity	56%
Test Mode	Mode1	Test Site	AC1

Frequency	Reading Level(dBuV/m)	Factor	Measure Level(dBuV/m)	Limit(3m) [dBuV/m]	Margin [dB]
Face On					
13.34	9.01	19.85	28.86	80.51	-51.65
13.51	10.81	19.87	30.68	90.47	-59.79
13.56	36.63	19.87	56.50	123.99	-67.49
13.61	12.02	19.86	31.88	90.47	-58.59
13.78	13.22	19.88	33.10	80.51	-47.41
Face Off					
13.36	7.64	19.85	27.49	80.51	-53.02
13.52	10.65	19.86	30.51	90.47	-59.96
13.56	30.64	19.87	50.51	123.99	-73.48
13.57	30.61	19.87	50.48	90.47	-39.99
13.72	8.17	19.87	28.04	80.51	-52.47

Note1: All measurements were performed using a loop antenna. The antenna was positioned in two orthogonal (face on and face off) and the position with the highest emission level was recorded.

Note2: Measurements were tested at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear extrapolation factor (40 dB/decade) as specified in &15.31(f)(2).

Extrapolation Factor = $40 \times \text{LOG}(30/3) = 40 \text{ dB}$

Note3: All measurements were recorded using a EMI test receiver employing a peak detector.

7.3. Out-band Emission

7.3.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (uV/m)
0.009 - 0.490	300	2400/F (kHz)
0.490 - 1.705	30	2400/F (kHz)
1.705 - 30	30	30
30 - 88	3	100
88 - 216	3	150
216 - 960	3	200
Above 960	3	500

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

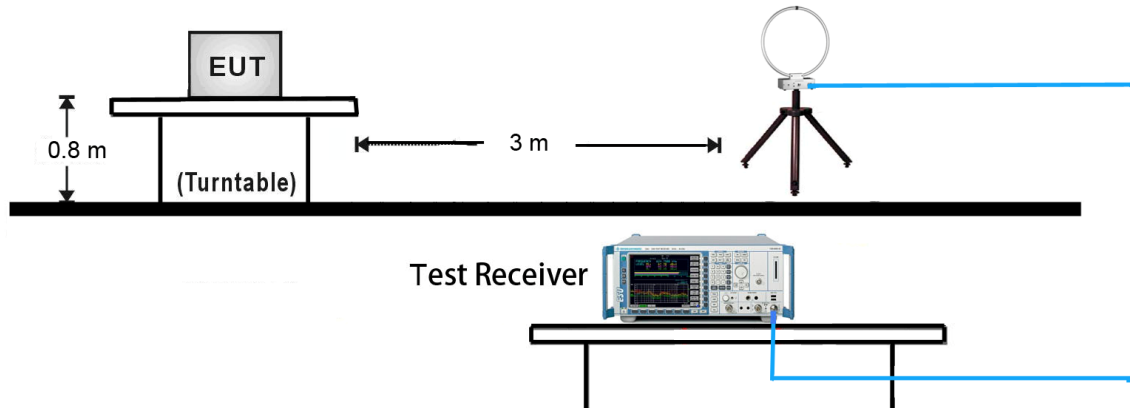
Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

7.3.2. Test Procedure Used

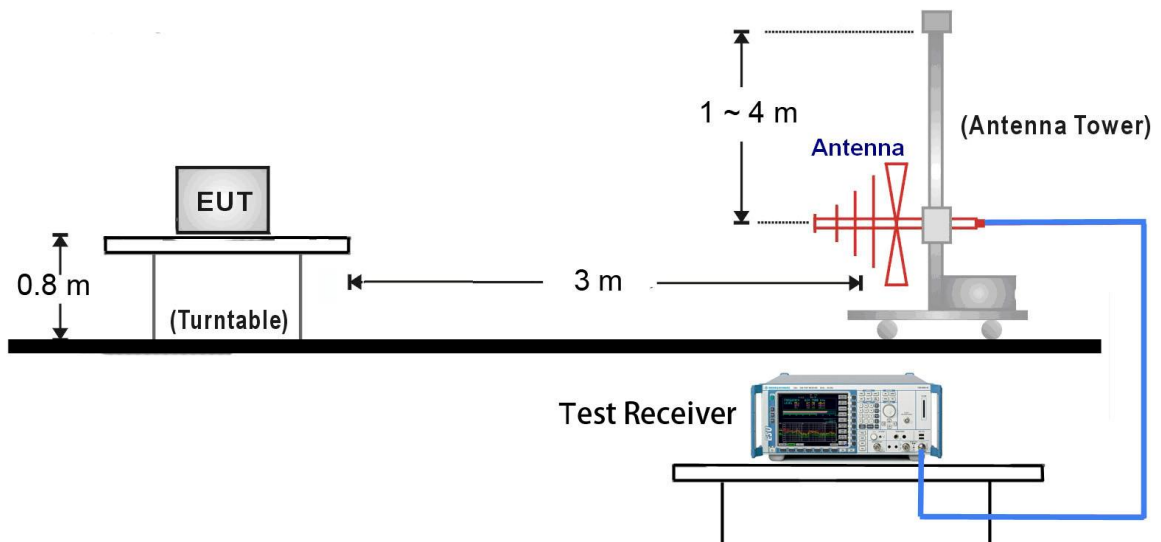
The EUT was tested from 9kHz up to the 1GHz excluding the band 13.110-14.010 MHz. All measurements were recorded with a spectrum analyzer employing an average detector for emissions below 30MHz. Above 30MHz a Quasi-peak detector was used. All out-of-band emissions must not exceed the limits shown as stated per Section 15.209. A loop antenna was used for searching for emissions below 30MHz.

7.3.3. Test Setup

9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



7.3.4. Test Result

Test Engineer	Snake Ni	Temperature	25°C
Test Time	2018/04/21	Relative Humidity	56%
Test Mode	Mode1	Test Site	AC1

Out-of-Band Emission Below 30MHz						
Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Face On						
27.12	-1.5	19.51	18.01	69.54	-51.53	QP
Face Off						
27.12	-0.7	19.51	18.81	69.54	-50.73	QP

Out-of-Band Emission Above 30MHz							
Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	44.55	4.10	14.33	18.43	40.00	-21.57	QP
H	90.63	8.82	10.37	19.19	43.50	-24.31	QP
H	107.60	7.25	11.85	19.10	43.50	-24.40	QP
H	165.80	2.93	14.77	17.70	43.50	-25.80	QP
H	203.15	6.42	11.26	17.68	43.50	-25.82	QP
H	396.66	3.15	16.52	19.67	46.00	-26.33	QP
V	43.58	15.50	14.38	29.88	40.00	-10.12	QP
V	58.62	9.16	13.57	22.73	40.00	-17.27	QP
V	68.32	9.74	11.90	21.64	40.00	-18.36	QP
V	87.72	11.30	10.27	21.57	40.00	-18.43	QP
V	107.60	10.60	11.85	22.45	43.50	-21.05	QP
V	176.96	8.49	13.36	21.85	43.50	-21.65	QP

Note1: All measurements were performed using a loop antenna. The antenna was positioned in two orthogonal (face on and face off) and the position with the highest emission level was recorded.

Note2: Measurements were tested at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear extrapolation factor (40 dB/decade) as specified in &15.31(f)(2).

Extrapolation Factor = $40 \times \log(30/3) = 40$ dB

Note3: All measurements were recorded using a EMI test receiver employing a peak detector.

7.4. 20dB Bandwidth

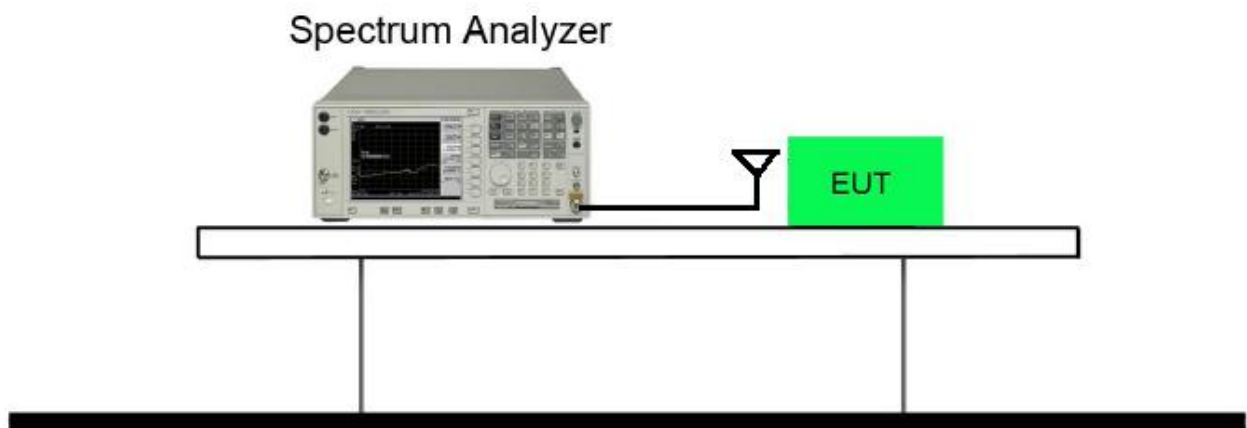
7.4.1. Test Limit

N/A

7.4.2. Test Procedure Used

The 20dB bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

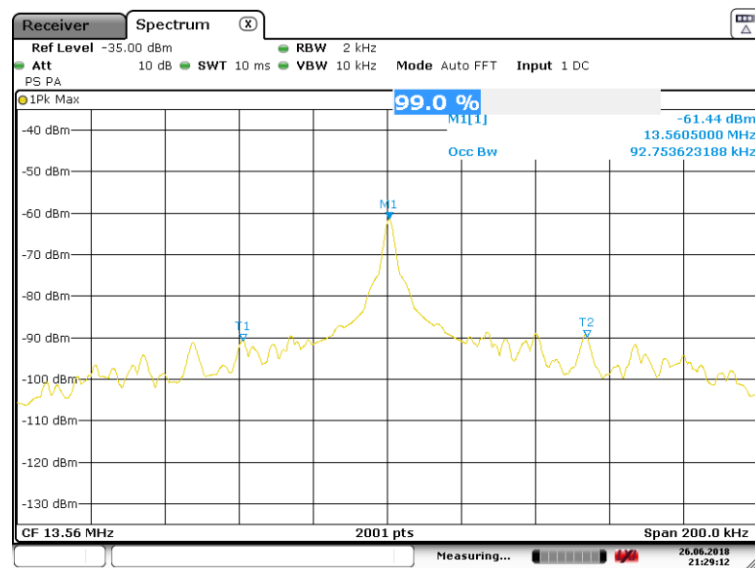
7.4.3. Test Setup



7.4.4. Test Result

Test Engineer	Snake Ni	Temperature	25°C
Test Time	2018/06/26	Relative Humidity	56%
Test Mode	Mode1	Test Site	AC1

Frequency (MHz)	20dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
13.56	13.09	92.75



Date: 26 JUN 2018 21:29:12



Date: 26 JUN 2018 21:30:51

7.5. Frequency Tolerance

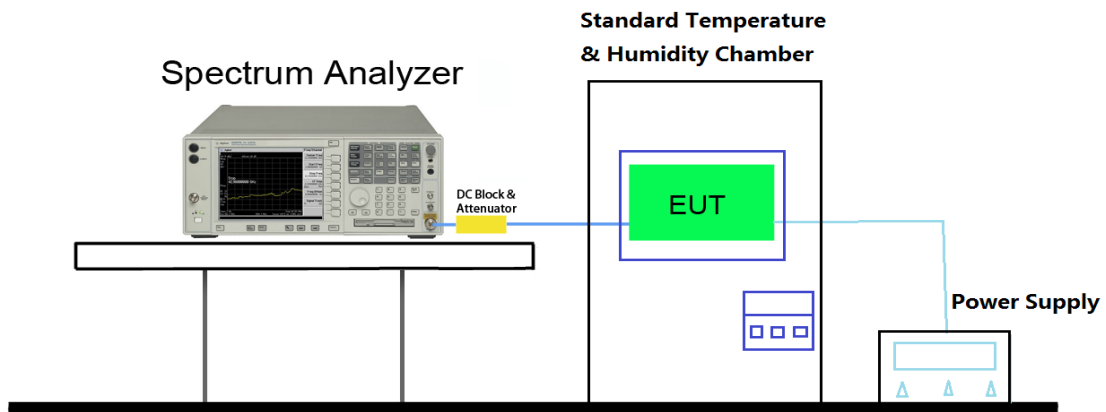
7.5.1. Test Limit

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency.

7.5.2. Test Procedure Used

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

7.5.3. Test Setup



7.5.4. Test Result

Test Engineer	Snake Ni	Temperature	25°C
Test Time	2018/04/21	Relative Humidity	56%
Test Mode	Mode1	Test Site	AC1

Operating Frequency: 13.56MHz					
Reference Voltage: 3.8Vdc					
Deviation Limit: +/- 0.01% = 1356Hz					
Voltage (%)	Power Battery	TEMP (°C)	FREQ. (Hz)	FREQ. Dev. (Hz)	Deviation (%)
100%	3.80	+20(Ref)	13,560,452	452	0.003333
100%		-20	13,560,646	646	0.004764
100%		-10	13,560,234	234	0.001726
100%		0	13,559,194	194	0.001431
100%		+10	13,560,673	673	0.004963
100%		+20	13,559,241	241	0.001777
100%		+30	13,560,188	188	0.001386
100%		+40	13,560,325	325	0.002397
100%		+50	13,560,357	357	0.002633
Battery End Point	3.50	+20	13,560,694	694	-1356 ~ +1356
115%	4.30	+20	13,560,942	942	-1356 ~ +1356

7.6. AC Conducted Emissions Measurement

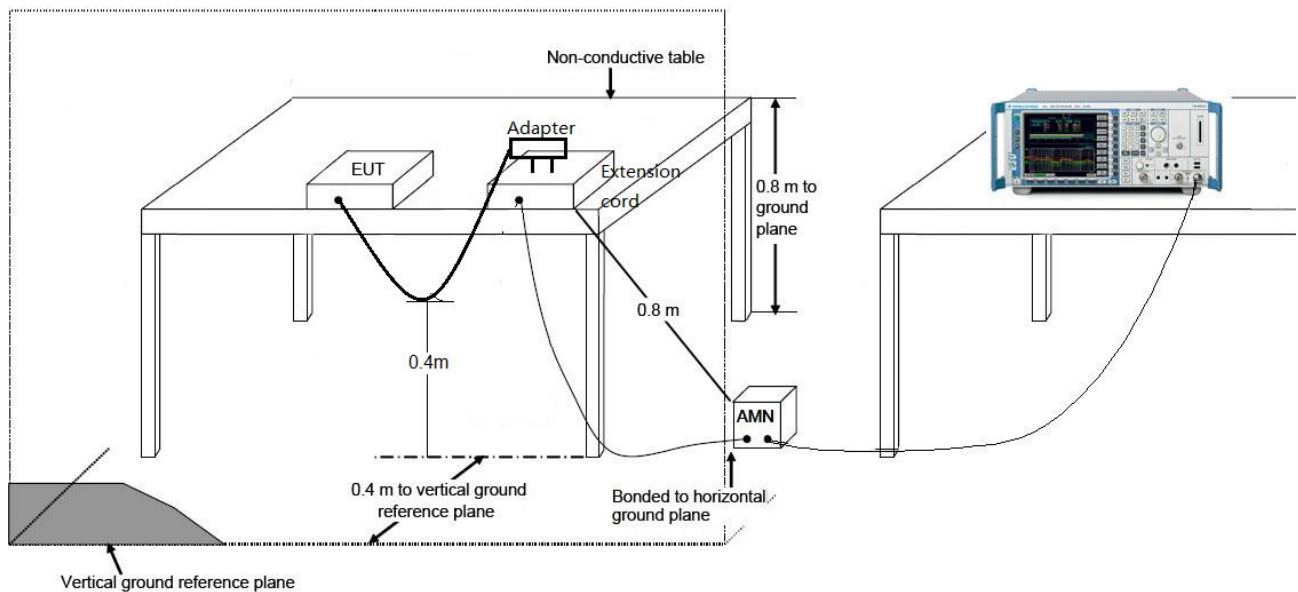
7.6.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

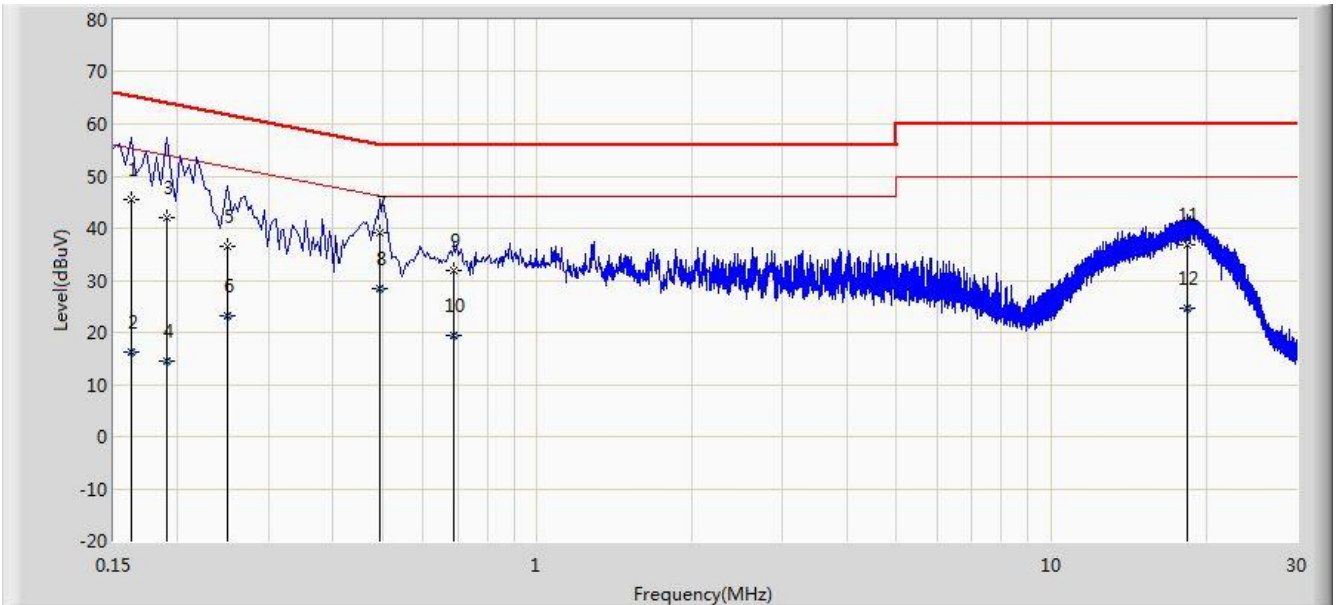
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.6.2. Test Setup



7.6.3. Test Result

Site: SR2	Time: 2018/04/27 - 13:54
Limit: FCC_Part15.207_CE_AC Power	Engineer: Bacon Dong
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: DOLPHIN CT40	Power: AC 120V/60Hz
Test Mode: Mode 1	

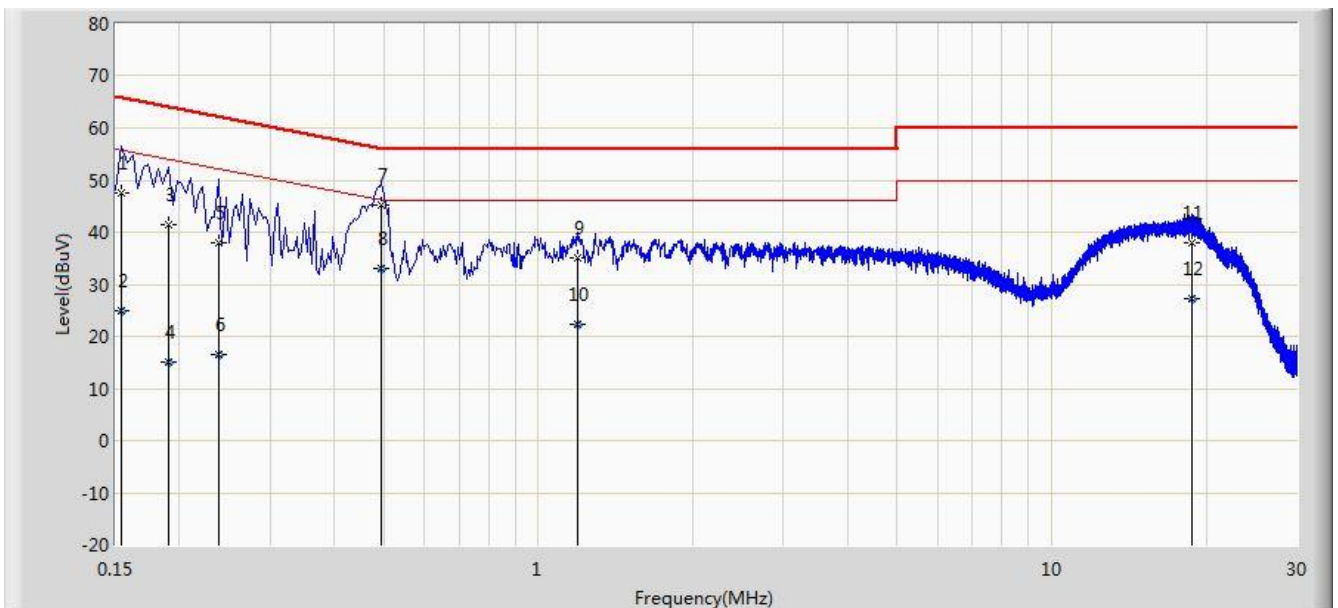


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.162	45.371	35.274	-19.990	65.361	10.097	QP
2			0.162	16.353	6.256	-39.008	55.361	10.097	AV
3			0.190	41.997	31.968	-22.039	64.037	10.029	QP
4			0.190	14.533	4.504	-39.504	54.037	10.029	AV
5			0.250	36.601	26.637	-25.156	61.757	9.964	QP
6			0.250	23.255	13.291	-28.502	51.757	9.964	AV
7		*	0.494	39.062	28.904	-17.038	56.100	10.158	QP
8			0.494	28.383	18.226	-17.717	46.100	10.158	AV
9			0.690	31.791	21.723	-24.209	56.000	10.068	QP
10			0.690	19.449	9.381	-26.551	46.000	10.068	AV
11			18.342	36.799	26.697	-23.201	60.000	10.102	QP
12			18.342	24.556	14.454	-25.444	50.000	10.102	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: SR2	Time: 2018/04/27 - 13:58
Limit: FCC_Part15.207_CE_AC Power	Engineer: Bacon Dong
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: DOLPHIN CT40	Power: AC 120V/60Hz
Test Mode: Mode 1	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.154	47.443	36.728	-18.338	65.781	10.716	QP
2			0.154	24.945	14.229	-30.836	55.781	10.716	AV
3			0.190	41.321	31.294	-22.715	64.037	10.028	QP
4			0.190	14.955	4.927	-39.081	54.037	10.028	AV
5			0.238	38.062	28.070	-24.104	62.166	9.992	QP
6			0.238	16.540	6.548	-35.626	52.166	9.992	AV
7		*	0.494	45.135	34.957	-10.965	56.100	10.178	QP
8			0.494	33.041	22.862	-13.060	46.100	10.178	AV
9			1.194	34.947	25.045	-21.053	56.000	9.903	QP
10			1.194	22.308	12.405	-23.692	46.000	9.903	AV
11			18.706	38.016	27.875	-21.984	60.000	10.141	QP
12			18.706	27.139	16.997	-22.861	50.000	10.141	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **DOLPHIN CT40 FCC ID:**

HD5-CT40L0N is in compliance with Part 15C of the FCC Rules and RSS rules.

The End