# FCC TEST REPORT

# **FOR**

# SHENZHEN DNS INDUSTRIES CO., LTD

Type C HUB with Wireless Charger

Test Model: CK-102A

Additional Model No.: Please Refer to Page 6

Prepared for : SHENZHEN DNS INDUSTRIES CO., LTD

Address : 23/F Building A, Shenzhen International Innovation Center,

No.1006 Shennan Road, Futian, Shenzhen, China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.

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Date of receipt of test sample : August 07, 2019

Number of tested samples : 1

Serial number : Prototype

Date of Test : August 08, 2019 ~ August 15, 2019

Date of Report : August 16, 2019

FCC TEST REPORT FCC CFR 47 PART 15C

Report Reference No. .....: LCS190805070AEA

Date of Issue .....: August 16, 2019

Testing Laboratory Name.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Address .....: 101, 601, Xingyuan Industrial Park, Tongda Road, Bao'an

Avenue, Bao'an District, Shenzhen, Guangdong, China

Testing Location/ Procedure .......: Full application of Harmonised standards ■

Partial application of Harmonised standards

Other standard testing method  $\square$ 

Applicant's Name .....: SHENZHEN DNS INDUSTRIES CO., LTD

Address ...... : 23/F Building A, Shenzhen International Innovation Center,

No.1006 Shennan Road, Futian, Shenzhen, China

**Test Specification** 

Standard.....: FCC CFR 47 PART 15C

Test Report Form No. .....: LCSEMC-1.0

TRF Originator.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF ..... : Dated 2011-03

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Test Item Description.....: Type C HUB with Wireless Charger

Trade Mark .....: DNS, QDOS

Test Model.....: CK-102A

Ratings .....: Input :PD 60W

USB 3.0 Output: DC 5V, 0.9A,

USB 2.0 Output :DC 5V, 0.5A (each)

USB 3.0+2\*USB 2.0 total Output :7W

Wireless charger Output :5W, 7.5W, 10W

Result .....: Positive

Compiled by: Supervised by: Approved by:

Juydan Thus Aking Jin Gnins Zimog

Jayden Zhuo / Administrators Aking Jin / Technique principal Gavin Liang/ Manager

# **FCC -- TEST REPORT**

Test Report No.: LCS190805070AEA August 16, 2019

Date of issue

Test Model..... : CK-102A EUT..... : Type C HUB with Wireless Charger : SHENZHEN DNS INDUSTRIES CO., LTD Applicant..... Address..... : 23/F Building A, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian, Shenzhen, China Telephone..... Fax..... : / Manufacturer..... : SHENZHEN DNS INDUSTRIES CO., LTD : 23/F Building A, Shenzhen International Innovation Center, Address..... No.1006 Shennan Road, Futian, Shenzhen, China Telephone..... : / Fax..... : / : HUIZHOU D&S CABLE CO., LTD. Factory..... Address..... : Longjin Dongjiang Industry ZoneShuikou, Huicheng, Huizhou, Guangdong, China Telephone..... : / : / Fax.....

Test Result	Positive
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

# **Revision History**

Revision	Issue Date	Revisions	Revised By
000	August 16, 2019	Initial Issue	Gavin Liang

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# 1. GENERAL INFORMATION

# 1.1 Description of Device (EUT)

EUT : Type C HUB with Wireless Charger

Test Model : CK-102A

Additional Model No. : QD-5139C-HUB, QD-5139C-HUBSG

All the models are identical with each other except the model

name is different, therefore, full test was applied on CK-102A,

Model Declaration : other models are deemed to fulfill the requirement without

further test.

Hardware Version : /
Software Version : /

Operating Frequency : 110KHz~205.0KHz

Modulation Type : CW (Continuous Wave)

Antenna Type : Coil Antenna
Power supply : Input :PD 60W

USB 3.0 Output: DC 5V, 0.9A,

USB 2.0 Output :DC 5V, 0.5A (each)
USB 3.0+2\*USB 2.0 total Output :7W

Wireless charger Output :5W, 7.5W, 10W

# 1.2 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
Apple Inc.	Mobile Phone	iphone X		FCC

### 1.3 External I/O Cable

I/O Port Description	Quantity	Cable
Micro USB Port	2	N/A

### 1.4 Description of Test Facility

FCC Registration Number is 254912.

Industry Canada Registration Number is 9642A-1.

EMSD Registration Number is ARCB0108.

UL Registration Number is 100571-492.

TUV SUD Registration Number is SCN1081.

TUV RH Registration Number is UA 50296516-001.

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier: CN0071

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

### 1.5 Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

### 1.6 Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
		9KHz~30MHz	3.10dB	(1)
		30MHz~200MHz	2.96dB	(1)
Radiation Uncertainty	:	200MHz~1000MHz	3.10dB	(1)
		1GHz~26.5GHz	3.80dB	(1)
		26.5GHz~40GHz	3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	1.63dB	(1)
Power disturbance	:	30MHz~300MHz	1.60dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

# 1.7 Description of Test Modes

Equipment under test was operated during the measurement under the following conditions:

☐ Charging and communication mode

Modulation Type: CW (Continuous Wave)

Test Mod	Test Modes:					
Mode 1	AC/DC Adapter + EUT + Mobile Phone (Battery Status: <1%)	Record				
Mode 2	AC/DC Adapter + EUT + Mobile Phone (Battery Status: <50%)	Pre-tested				
Mode 3	AC/DC Adapter + EUT + Mobile Phone (Battery Status: 100%)	Pre-tested				
Note: All	Note: All test modes were pre-tested, but we only recorded the worst case in this report.					

For AC conducted emission, pre-test at both AC 120V/60Hz and AC 240V/50Hz, recorded worst case;

### 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR PART 15C 15.207 and 15.209.

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### 2.2 EUT Exercise

The EUT was operated in the charging and compunction mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207 and 15.209 under the FCC Rules Part 15 Subpart C.

#### 2.3 General Test Procedures

### 2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

### 2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013

# 3. SYSTEM TEST CONFIGURATION

# 3.1 Justification

The system was configured for testing in a normal condition.

### 3.2 EUT Exercise Software

N/A.

# 3.3 Special Accessories

No.	Equipment	Manufacturer	Model No.	Serial No.	shielded/ unshielded	Notes
1	Apple Inc.	Mobile Phone	iphone X		Apple Inc.	Mobile Phone

# 3.4 Block Diagram/Schematics

Please refer to the related document.

# 3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

# 3.6 Test Setup

Please refer to the test setup photo.

# 4. SUMMARY OF TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date	
1	MXA Signal Analyzer	Agilent	N9020A	MY49100040	2019-06-11	2020-06-10	
2	SPECTRUM ANALYZER	R&S	FSP40	100503	2018-11-15	2019-11-14	
3	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2019-06-12	2020-06-11	
4	Positioning Controller	MF	MF-7082	/	2019-06-12	2020-06-11	
5	EMI Test Software	AUDIX	E3	/	N/A	N/A	
6	EMI Test Receiver	R&S	ESR 7	101181	2019-06-12	2020-06-11	
7	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2019-07-25	2020-07-24	
8	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2019-07-25	2020-07-24	
9	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2019-07-01	2020-06-30	
10	RF Cable-R03m	Jye Bao	RG142	CB021	2019-06-12	2020-06-11	
11	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2019-06-12	2020-06-11	
12	EMI Test Receiver	R&S	ESPI	101840	2019-06-11	2020-06-10	
13	Artificial Mains	R&S	ENV216	101288	2019-06-12	2020-06-11	
14	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2019-06-11	2020-06-10	
Note:	Note: All equipment is calibrated through CHINA CEPREI LABORATORY and GUANGZHOU LISAI CALIBRATION AND TEST CO., LTD.						

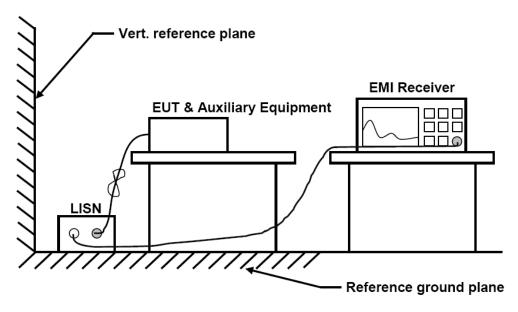
# 5. SUMMARY OF TEST RESULT

Test Item	FCC Rule No.	Temperature conditions	Power source conditions	С	NC	NA	NP	Remark
Radiated Emission	§15.209	Nominal	Nominal	$\boxtimes$				-/-
AC conducted emission	§15.207	Nominal	Nominal	$\boxtimes$				-/-

Remark: The measurement uncertainty is not included in the test result.

# 6. POWER LINE CONDUCTED MEASUREMENT

### 6.1. Block Diagram of Test Setup



### 6.2. Standard Applicable

According to §15.207: For all the consumer devices which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range	Limits (dBµV)			
(MHz)	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		

<sup>\*</sup> Decreasing linearly with the logarithm of the frequency

#### 6.3 Test Results

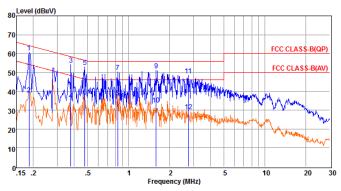
#### PASS.

The test data please refer to following page.

Temperature	<b>25.1</b> ℃	Humidity	53.2%
Test Engineer	Wang Chuang		

# AC Conducted Emission of charge from power adapter mode @ AC 240V/50Hz

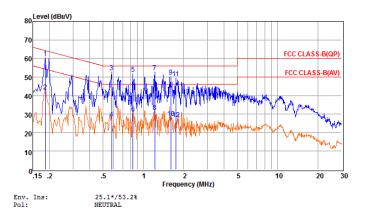
### Line



Env.	Ins:	25.1*/53.2
Do1 •		TIME

	rreq	Reading	LISHFAC	Capros	measured	TIMIT	Over	Velligtx
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.19	41.18	9.62	0.02	60.82	64.20	-3.38	QP
2	0.19	18.74	9.62	0.02	38.38	54.19	-15.81	Average
3	0.38	34.52	9.62	0.04	54.18	58.34	-4.16	QP
4	0.38	15.81	9.62	0.04	35.47	48.34	-12.87	Average
5	0.48	33.37	9.62	0.04	53.03	56.36	-3.33	QP
6	0.48	17.50	9.62	0.04	37.16	46.36	-9.20	Average
7	0.83	30.70	9.64	0.04	50.38	56.00	-5.62	QP
8	0.83	17.09	9.64	0.04	36.77	46.00	-9.23	Average
9	1.59	31.53	9.64	0.05	51.22	56.00	-4.78	QP
10	1.59	13.42	9.64	0.05	33.11	46.00	-12.89	Average
11	2.75	28.91	9.64	0.05	48.60	56.00	-7.40	QP
12	2.75	9.81	9.64	0.05	29.50	46.00	-16.50	Average

### Neutral



	Freq	Reading	LisnFac	CabLos	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.19	40.64	9.62	0.02	60.28	64.20	-3.92	QP
2	0.19	22.55	9.62	0.02	42.19	54.19	-12.00	Average
3	0.58	33.12	9.62	0.04	52.78	56.00	-3.22	QP
4	0.58	7.87	9.62	0.04	27.53	46.00	-18.47	Average
5	0.83	32.16	9.63	0.04	51.83	56.00	-4.17	QP
6	0.83	10.61	9.63	0.04	30.28	46.00	-15.72	Average
7	1.22	33.02	9.63	0.05	52.70	56.00	-3.30	QP
8	1.22	11.56	9.63	0.05	31.24	46.00	-14.76	Average
9	1.60	30.69	9.63	0.05	50.37	56.00	-5.63	QP
10	1.60	8.17	9.63	0.05	27.85	46.00	-18.15	Average
11	1.74	29.78	9.63	0.05	49.46	56.00	-6.54	QP
12	1.74	7.60	9.63	0.05	27.28	46.00	-18.72	Average

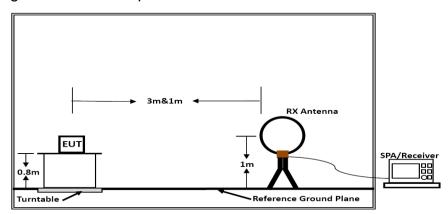
Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss.
2. The emission levels that are 20dB below the official limit are not reported.

Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss.
2. The emission levels that are 20dB below the official limit are not reported.

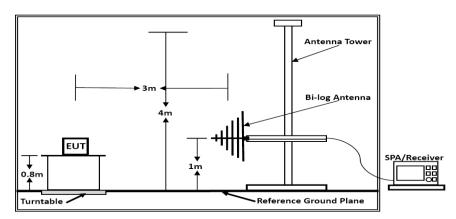
<sup>\*\*\*</sup>Note: Pre-scan all modes and recorded the worst case results in this report.

# 7. RADIATED EMISSION MEASUREMENT

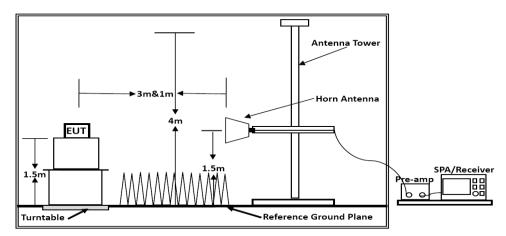
# 7.1. Block Diagram of Test Setup



Below 30MHz



Below 1GHz



Above 1GHz

### 7.2. Radiated Emission Limit

15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
\1\ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293.	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(\2\)
13.36-13.41		_	

\1\ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

#### \2\ Above 38.6

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

# 7.3. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

# 7.4. Operating Condition of EUT

- (1) Setup the EUT as shown in Section 4.1.
- (2) Let the EUT work in worst test mode (Mode 1) and measure it.

### 7.5. Measuring Setting

The following table is the setting of spectrum analyzer and receiver.

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

### 7.6. Test Procedure

### 1) Sequence of testing 9 kHz to 30 MHz

#### Setup:

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- --- If the EUT is a floor standing device, it is placed on the ground.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

#### **Premeasurement:**

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna height is 0.8 meter.
- --- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

#### Final measurement:

- --- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).
- --- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with.
- --- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

### 2) Sequence of testing 30 MHz to 1 GHz

### Setup:

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- --- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

#### Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height changes from 1 to 3 meter.
- --- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

#### Final measurement:

- --- The final measurement will be performed with minimum the six highest peaks.
- --- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.
- --- The final measurement will be done with QP detector with an EMI receiver.
- --- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

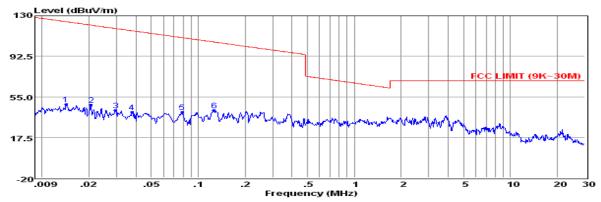
### 7.7. Test Results

#### PASS.

Only report the worst test data (Mode 1) in test report; The test data please refer to following page:

Temperature	23.8℃	Humidity	53.7%
Test Engineer	Wang Chuang		

### 0.009~30MHz



Env./Ins:

23.8℃/53.7%

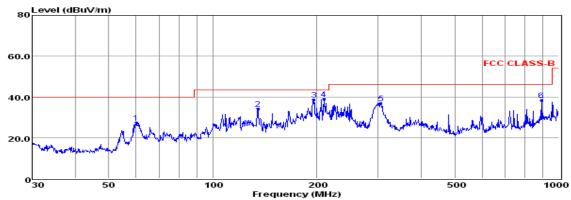
pol:

	Freq	Reading	CabLos	Antfac	Measure	d Limit	Over	Remark
	MHz	dBuV	dВ	dB/m	dBuV/m	dBuV/m	dВ	
1	0.01	47.55	0.30	0.00	47.85	124.51	-76.66	QP
2	0.02	47.10	0.30	0.00	47.40	121.36	-73.96	QP
3	0.03	42.32	0.30	0.00	42.62	118.21	-75.59	QP
4	0.04	40.20	0.30	0.00	40.50	116.11	-75.61	QP
5	0.08	40.41	0.30	0.00	40.71	109.74	-69.03	QP
6	0.13	42.29	0.30	0.00	42.59	105.68	-63.09	QP

- Note: 1. All readings are Quasi-peak values.
  2. Measured= Reading + Antenna Factor + Cable Loss
  3. The emission that are 20db below the official limit are not reported

#### 30MHz~1000MHz

#### Horizontal



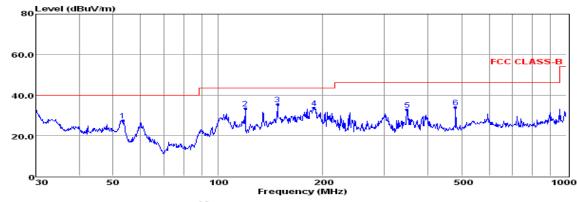
Env./Ins: pol:

24.5°C/54.7% HORIZONTAL

	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dВ	dB/m	dBuV/m	dBuV/m	dВ	
1	60.07	14.14	0.49	12.66	27.29	40.00	-12.71	QP
2	135.03	24.92	0.74	8.56	34.22	43.50	-9.28	QP
3	195.82	27.17	0.96	10.57	38.70	43.50	-4.80	QP
4	209.31	27.16	0.86	10.86	38.88	43.50	-4.62	QP
5	305.68	22.80	1.05	13.14	36.99	46.00	-9.01	QP
6	890.73	15.55	1.86	20.99	38.40	46.00	-7.60	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

#### Vertical



Env./Ins: pol:

24.5℃/54.7% VERTICAL

	rred	Reading	Capros	Anciac	Measured	TIMIC	Over	Remark
	MHz	dBuV	dВ	dB/m	dBuV/m	dBuV/m	dВ	
1	53.32	13.70	0.46	13.10	27.26	40.00	-12.74	QP
2	119.86	22.29	0.64	10.51	33.44	43.50	-10.06	QP
3	148.44	26.13	0.86	8.25	35.24	43.50	-8.26	QP
4	189.07	22.29	0.86	10.48	33.63	43.50	-9.87	QP
5	349.25	17.45	1.13	14.26	32.84	46.00	-13.16	QP
6	480.53	16.38	1.31	16.08	33.77	46.00	-12.23	QP

Note: 1. All readings are Quasi-peak values.
2. Measured= Reading + Antenna Factor + Cable Loss
3. The emission that are 20db below the official limit are not reported

### Note:

- 1). Pre-scan all modes and recorded the worst case results in this report.
- 2). Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3). Corrected Reading: Antenna Factor + Cable Loss + Read Level = Level.

# 8. PHOTOGRAPHS OF TEST SETUP

Please refer to separated files for Test Setup Photos of the EUT.

# 9. EXTERNAL PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

# 10. INTERNAL PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF REPORT-----