

FCC 22H & 24H
(Class II Permissive Change)
3GHz Report
for

Delta Electronics Incorporated

**3 Tungyuan Road, Chungli Industrial Zone,
Taoyuan County, Taiwan**

Brand : Delta
Product Name : Data Collector with 3G
Model Name : SGDC-D22
FCC ID : H79PH8-P

TABLE OF CONTENTS

Description	Page
TEST REPORT CERTIFICATION	3
1. REPORT HISTORY.....	4
2. SUMMARY OF TEST RESULTS	5
3. GENERAL INFORMATION	6
3.1. Description of EUT	6
3.2. Antenna Information	7
3.3. Test Configuration	7
3.4. Setup Configuration	7
3.5. Operating Condition of EUT	7
3.6. Description of Test Facility	8
3.7. Measurement Uncertainty	8
4. MEASUREMENT EQUIPMENT LIST.....	9
4.1. RF Conducted Measurement	9
4.2. Radiated Emission Measurement	9
5. RF OUTPUT POWER MEASUREMENT	10
5.1. Block Diagram of Test Setup	10
5.2. Specification Limits	10
5.3. Test Procedure	10
5.4. Test Results	11
6. RADIATED EMISSION MEASUREMENT	14
6.1. Block Diagram of Test Setup	14
6.2. Specification Limits	15
6.3. Test Procedure	15
6.4. Test Results	16
7. DEVIATION TO TEST SPECIFICATIONS.....	17
8. PHOTOGRAPHS.....	18

TEST REPORT CERTIFICATION (Class II Permissive Change)

Applicant : Delta Electronics Incorporated
Product Name : Data Collector with 3G
Model No. : SGDC-D22
Serial No. : N/A
Brand : Delta
Power Supply : DC 12-48V

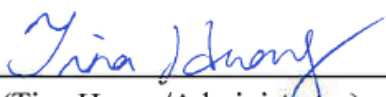
Applicable Standards:

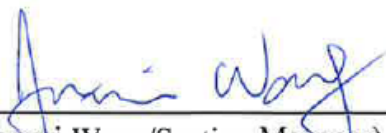
FCC Rules and Regulations Part 24 Subpart E
ANSI C63.26:2015

AUDIX Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report. **AUDIX Technology Corp.** does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Test: 2016. 11. 15

Date of Report: 2016. 11. 16

Producer: 
(Tina Huang/Administrator)

Signatory: 
(Jarwei Wang/Section Manager)

1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2016. 11. 16	Original Report.	EM-F160768

2. SUMMARY OF TEST RESULTS

Rule	Description	Results
24.232(d)	RF Output Power	PASS
24.238(a)	Radiated Emission	PASS

3. GENERAL INFORMATION

3.1. Description of EUT

Product	Data Collector with 3G
Model Number	SGDC-D22
Serial Number	N/A
Brand Name	Delta
Applicant	Delta Electronics Incorporated 3 Tungyuan Road, Chungli Industrial Zone, Taoyuan County, Taiwan
Fundamental Range	WCDMA Band II UL: 1852.4MHz ~ 1907.6MHz DL: 1932.4MHz ~ 1987.6MHz
Frequency Channel	WCDMA Band: Band II: UL: CH 9262 ~ CH9538; DL: CH 9662 ~ CH9938
Radio Technology	QPSK/16-QAM/64-QAM
Transmit Type	1TRX
Switching Adapter	DVE, M/N: DSA-12G-12 FUS Input: AC 100-240V~, 50/60Hz, 0.3A Output: 12V, 1A
Date of Receipt of Sample	2016. 10. 20
Information for Class II Change Permissive:	The difference with original FCC ID: H79PH8-P is change product name to Data Collector with 3G and to add a 3G antenna.

3.2. Antenna Information

Antenna Part Number	Manufacture	Antenna Type	Frequency	Max Gain
6613G03071	KINSUN Industries Inc.	1/4λ Dipole Antenna	1850 ~ 1910MHz	1.6dBi

3.3. Test Configuration

Item		Mode	Test Channel
Radiated Test Case	Radiated Spurious Emission (30MHz-1GHz)	WCDMA Band II	9262/9400/9538
	Radiated Spurious Emission (Above 1GHz)	WCDMA Band II	
Conducted Test Case	Peak Output Power	WCDMA Band II	9262/9400/9538
		HSDPA Band II	
		HSUPA Band II	

3.4. Setup Configuration

3.4.1. EUT Configuration for Radiated Emission



3.4.2. EUT Configuration for Conducted Test Items



3.5. Operating Condition of EUT

To set EUT on RF function under continues transmitting and choosing data rate/channel.

3.6. Description of Test Facility

Test Firm Name : **AUDIX Technology Corporation**
EMC Department
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan

Test Location & Facility : **Semi-Anechoic Chamber**
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan
Federal Communication Commission
Registration Number: 90993
Renewal on May 06 2015

Fully Anechoic Chamber
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan
Renewal on August 31, 2015

NVLAP Lab. Code : 200077-0

TAF Accreditation No : 1724

3.7. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	± 5.82dB

Remark : Uncertainty = $k_{uc}(y)$

Test Item	Uncertainty
Peak Output Power	± 0.33dB

4. MEASUREMENT EQUIPMENT LIST

4.1. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-507	MY52220264	2016. 08. 09	1 Year
2.	Radio Communication Analyzer	Anritsu	MT8821C	6201571640	2016. 02. 19	1 Year

4.2. Radiated Emission Measurement

4.2.1. Frequency Range 30MHz~1000MHz (Semi Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010B-544	MY55460198	2016. 04. 20	1 Year
2.	Test Receiver	R & S	ESCI	100556	2015. 06. 24	1 Year
3.	Amplifier	HP	8447D	1937A02488	2016. 05. 05	1 Year
4.	TRILOG Broad band antenna	Schwarzbeck	VULB 9168	714	2016. 07. 20	1 Year
5.	Radio Communication Analyzer	Agilent	MT8821C	6201571640	2016. 02. 19	1 Year
6.	Test Software	Audix	e3	V.9.160926	N.C.R.	N.C.R.

4.2.2. Frequency Range Above 1GHz (Fully Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010B-544	MY55460198	2016. 04. 20	1 Year
2.	Amplifier	Agilent	8449B	3008A02678	2016. 03. 04	1 Year
3.	Tunable Notch Filter	K&L	3TNF-800/1000-0.2-N/N	498	2016. 01. 28	1 Year
4.	Tunable Notch Filter	K&L	5TNF-1700/2000-01-N/N	344	2016. 10. 23	1 Year
5.	Notch Filter	Micro Wave	H3G018G1	484797	2016. 08. 26	1 Year
6.	Notch Filter	Micro Wave	H1G013G1	459777	2016. 06. 18	1 Year
7.	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00135902	2016. 03. 05	1 Year
8.	Horn Antenna	EMCO	3116	2653	2015. 10. 20	1 Year
9.	Radio Communication Analyzer	Agilent	MT8821C	6201571640	2016. 02. 19	1 Year
10.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

5. RF OUTPUT POWER MEASUREMENT

5.1. Block Diagram of Test Setup



5.2. Specification Limits

FCC §2.1046

FCC §22.913(a): The Effective Radiated Power (E.R.P) of Mobile transmitter auxiliary test transmitter must not exceed 7 Watts (38.45dBm)

FCC §24.232(d): Mobile/portable stations are limited to 2 Watts (33dBm) Effective Isotropic Radiated Power (E.I.R.P) peak power.

5.3. Test Procedure

The conducted RF output power measurements were made at the RF output terminals of the EUT using an attenuator, power splitter and spectrum analyzer. The EUT was controlled via the Universal Radio Communication tester Anritsu MT8821C selecting maximum transmission power of the EUT and different modes of modulation.

For radiated measurements the EUT setup on the turn table which has 0.8m (For 30-1000MHz) or 1.5m (For Above 1GHz) height to the ground. The measuring antenna was placed at 3m distance and the maximum field strength was measured for the three channels. The EUT was controlled via the Universal Radio Communication tester Anritsu MT8821C selecting maximum transmission power of the EUT and different modes of modulation.

The Effective Radiated Power (E.R.P.) is obtained by using the Substitution Method according to ANSI 63.26:2015 or according to KDB412172 D01. Here the result we presented is used the method reference to KDB412172 D01.

The Effective Isotropic Radiated Power (E.I.R.P.) is obtained by using the Substitution Method according to ANSI 63.26:2015 or according to KDB412172 D01. Here the result we presented is used the method reference to KDB412172 D01.

5.4. Test Results

Test Date	2016/11/15	Temp./Hum.	23°C/60%
Test Voltage	AC 120V/60Hz (Via Switching Adapter)		

5.4.1. Peak Output Power

Type of Modulation		Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)
WCDMA Band II		CH 9262	1852.40	27.135	33
		CH 9400	1880.00	25.694	
		CH 9538	1907.60	25.335	
HSDPA Band II	Case 1	CH 9262	1852.40	27.157	
		CH 9400	1880.00	25.494	
		CH 9538	1907.60	25.705	
	Case 2	CH 9262	1852.40	27.678	
		CH 9400	1880.00	25.809	
		CH 9538	1907.60	25.111	
	Case 3	CH 9262	1852.40	27.217	
		CH 9400	1880.00	25.364	
		CH 9538	1907.60	25.831	
	Case 4	CH 9262	1852.40	27.728	
		CH 9400	1880.00	25.321	
		CH 9538	1907.60	25.778	

Type of Modulation		Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)
HSUPA Band II	Case 1	CH 9262	1852.40	28.525	33
		CH 9400	1880.00	26.753	
		CH 9538	1907.60	26.006	
	Case 2	CH 9262	1852.40	27.519	
		CH 9400	1880.00	26.203	
		CH 9538	1907.60	24.930	
	Case 3	CH 9262	1852.40	28.463	
		CH 9400	1880.00	26.477	
		CH 9538	1907.60	25.086	
	Case 4	CH 9262	1852.40	28.529	
		CH 9400	1880.00	25.919	
		CH 9538	1907.60	24.738	
	Case 5	CH 9262	1852.40	28.567	
		CH 9400	1880.00	25.647	
		CH 9538	1907.60	25.442	

5.4.1.Average Output Power

Type of Modulation		Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)
WCDMA Band II		CH 9262	1852.40	23.523	33
		CH 9400	1880.00	21.811	
		CH 9538	1907.60	20.840	
HSDPA Band II	Case 1	CH 9262	1852.40	23.716	
		CH 9400	1880.00	22.646	
		CH 9538	1907.60	21.917	
	Case 2	CH 9262	1852.40	23.625	
		CH 9400	1880.00	22.570	
		CH 9538	1907.60	21.413	
	Case 3	CH 9262	1852.40	23.681	
		CH 9400	1880.00	22.463	
		CH 9538	1907.60	20.191	
	Case 4	CH 9262	1852.40	23.910	
		CH 9400	1880.00	21.109	
		CH 9538	1907.60	19.576	
HSUPA Band II	Case 1	CH 9262	1852.40	23.742	33
		CH 9400	1880.00	21.797	
		CH 9538	1907.60	22.043	
	Case 2	CH 9262	1852.40	23.685	
		CH 9400	1880.00	21.867	
		CH 9538	1907.60	21.708	
	Case 3	CH 9262	1852.40	23.710	
		CH 9400	1880.00	20.909	
		CH 9538	1907.60	22.054	
	Case 4	CH 9262	1852.40	23.723	
		CH 9400	1880.00	21.355	
		CH 9538	1907.60	21.372	
	Case 5	CH 9262	1852.40	23.663	
		CH 9400	1880.00	19.954	
		CH 9538	1907.60	19.962	

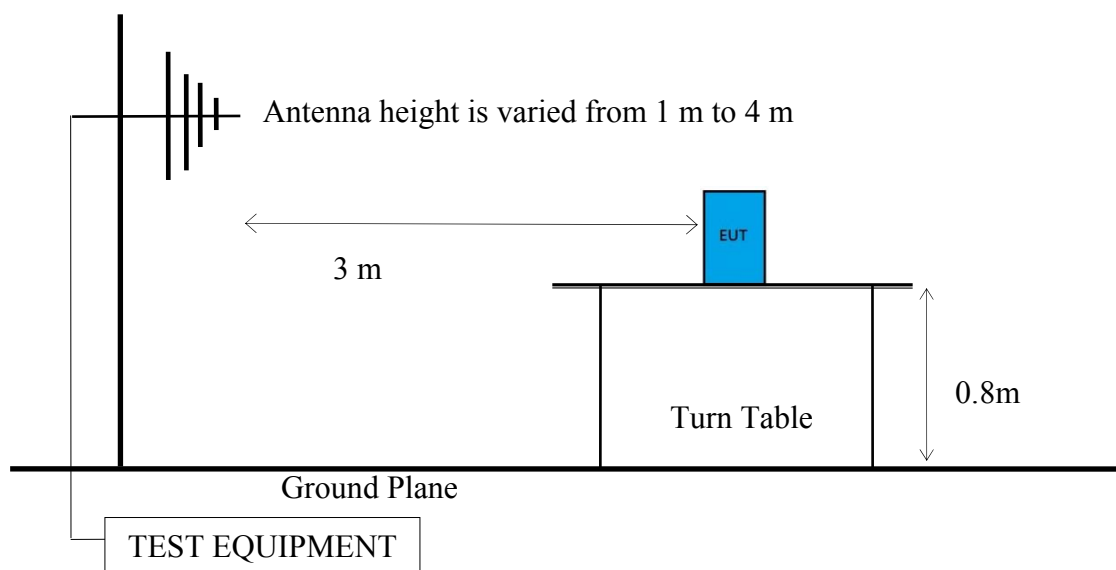
6. RADIATED EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup

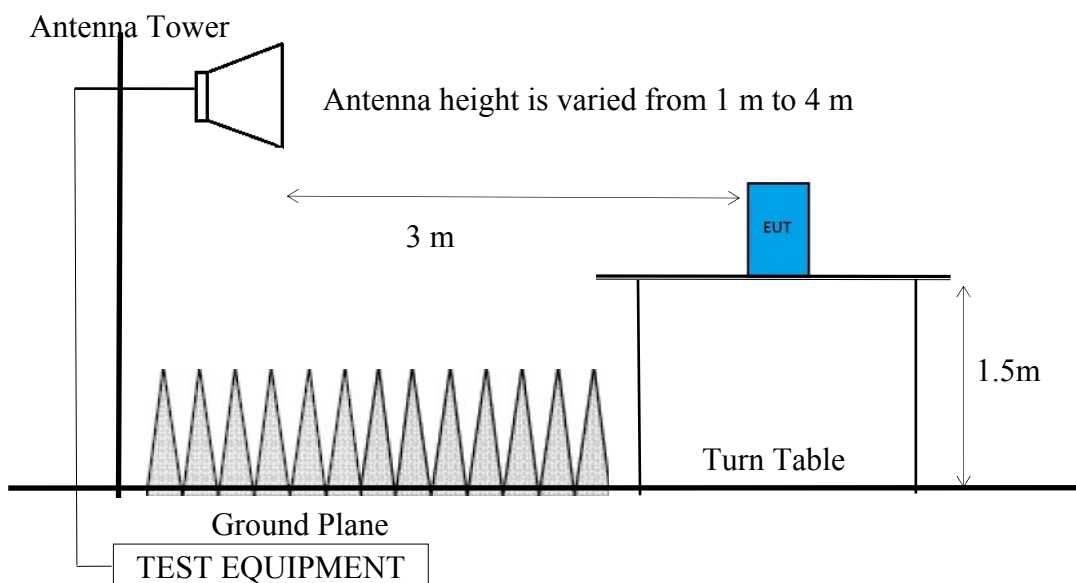
6.1.1. Block Diagram of connection between EUT and simulators

Indicated as section 3.7

6.1.2. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000 MHz



6.1.3. Fully Anechoic Chamber (3m) Setup Diagram for above 1GHz



6.2. Specification Limits

FCC §2.1053

FCC §22.917(a)

FCC §24.238(a)

According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43+10\log(P)$ dB, P in watts.

At P_o transmitting power, the specified minimum attenuation becomes $43+10\log(P_o)$, and the level in dBm relative P_o becomes:

$P_o \text{ (dBm)} - [43+10\log(P_o \text{ in m watts})-30] = -13\text{dBm}$

6.3. Test Procedure

The measurement was performed with the EUT inside a semi-anechoic chamber. The spectrum was scanned from 30MHz to at least the 10th harmonic of the highest frequency generated within the equipment. The EUT was placed on a 1 meter high non-conductive stand at a 3 meter distance from the measuring antenna for measurements below 1GHz and above 1GHz.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded. The radiated emissions were measured with peak detector and 1MHz bandwidth. Each detected emissions were substituted by the Substitution method, in accordance with the ANSI/TIA-603-D:2010.

6.4. Test Results

Test Date	2016/11/15	Temp./Hum.	23°C/60%
Test Voltage	AC 120V/60Hz (Via Switching Adapter)		

WCDMA Band II				
Test Frequency (MHz)	Frequency (MHz)	Spurious emission level (dBm)	Limit (dBm)	Antenna Polarization
1852.40 (CH9262)	3704.80	-42.54	-13.00	Horizontal
	5557.20	-49.83	-13.00	
	7409.60	-58.71	-13.00	
	3704.80	-45.91	-13.00	Vertical
	5557.20	-53.22	-13.00	
	7409.60	-61.79	-13.00	
1880.40 (CH9400)	3704.80	-44.81	-13.00	Horizontal
	5557.20	-52.08	-13.00	
	7409.60	-60.37	-13.00	
	3704.80	-53.29	-13.00	Vertical
	5557.20	-55.64	-13.00	
	7409.60	-65.71	-13.00	
1907.60 (CH9538)	3704.80	-44.63	-13.00	Horizontal
	5557.20	-52.45	-13.00	
	7409.60	-60.83	-13.00	
	3704.80	-53.70	-13.00	Vertical
	5557.20	-55.93	-13.00	
	7409.60	-65.35	-13.00	

Note: WCDMA presents the worst case for it has the max power through all modes.

7. DEVIATION TO TEST SPECIFICATIONS

【NONE】