Variant FCC RF Test Report

APPLICANT	:	Doro AB
EQUIPMENT	:	GSM/GPRS WCDMA Mobile Telephone
BRAND NAME	:	doro
MODEL NAME	:	Doro PhoneEasy 626
MARKETING NAME	:	Doro PhoneEasy 626
FCC ID	:	WS5DORO626
STANDARD	:	FCC Part 15 Subpart C §15.247
CLASSIFICATION	:	(DSS) Spread Spectrum Transmitter

The product was received on Sep. 19, 2014 and testing was completed on Oct. 19, 2014. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory
2353

SPORTON INTERNATIONAL (SHENZHEN) INC.
No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR312203-03	Rev. 01	This is a variant report for Doro PhoneEasy 626. The product equality declaration could be referred to Appendix C. Based on the original test report; only the worst cases of Radiated Spurious Emission from original test report (Sporton Report Number FR312203-01) were verified for the differences.	Nov. 05, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	RSS-210 A8.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.17 dB at 32.910 MHz

1 General Description

1.1 Applicant

Doro AB
Magistratsvägen 10 SE-226 43 Lund Sweden

1.2 Manufacturer

CK TELECOM LTD.
Technology Road. High-Tech Development Zone. Heyuan, Guangdong, P.R.China.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	GSM/GPRS WCDMA Mobile Telephone
Brand Name	doro
Model Name	Doro PhoneEasy 626
Marketing Name	Doro PhoneEasy 626
FCC ID	WS5DORO626
EUT supports Radios application	GSM/GPRS/WCDMA/HSPA/Bluetooth v2.1 + EDR
HW Version	SHUTTLE-V2.0
SW Version	SHUTTLE-S13A_DORO626_L3EN_300_140909
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Antenna Type	PIFA Antenna with gain -2.00 dBi
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755-3320-2398	
Test Site No.	**Sporton Site No.**	**FCC/IC Registration No.**
	03CH01-SZ	831040/4086F-1

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC Public Notice DA 00-705
- ANSI C63.4-2003
- IC RSS-210 Issue 8
- IC RSS-Gen Issue 3
- NOTICE 2012-DRS0126

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.
3. Per the section 2.2.3 of Notice of 2012-DRS0126, " Receivers Excluded from Industry Canada Requirements", only radiocommunication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to Industry Canada requirements.

2 Test Configuration of Equipment Under Test

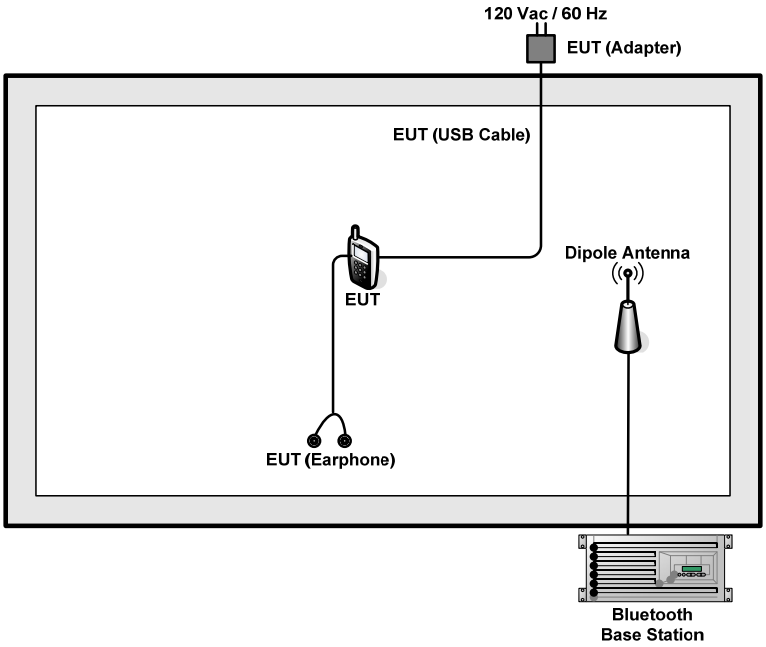
2.1 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Summary table of Test Cases	
Test Item	**Data Rate / Modulation**
Radiated Test Cases	**Bluetooth EDR 3Mbps 8-DPSK**
	Mode 1: CH78_2480 MHz for Sample 1
	Mode 2: CH78_2480 MHz for Sample 2
	Mode 3: CH78_2480 MHz for Sample 3
Remark: For Radiated Test Cases, The tests were performance with Adapter, Earphone and USB Cable.	

2.2 Connection Diagram of Test System

<Bluetooth Tx Mode>



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Base Station	R&S	CBT32	N/A	N/A	Unshielded, 1.8 m
3.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A

2.4 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT connect with Bluetooth base station to continuous transmit/receive.

3 Test Result

3.1 Radiated Band Edges and Spurious Emission Measurement

3.1.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (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

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

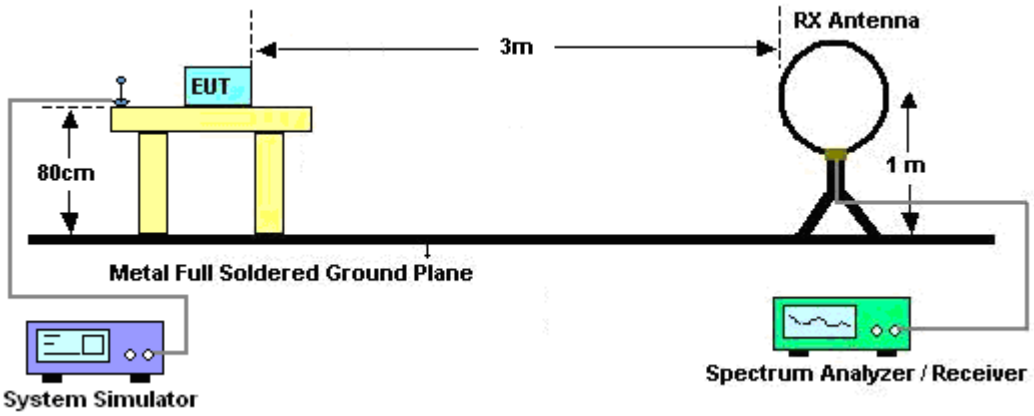
3.1.3 Test Procedures

1. The testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement: use duty cycle correction factor method per 15.35(c).
   Duty cycle = On time/100 milliseconds
   On time = $N_1*L_1+N_2*L_2+...+N_{n-1}*LN_{n-1}+N_n*L_n$
   Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
   Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

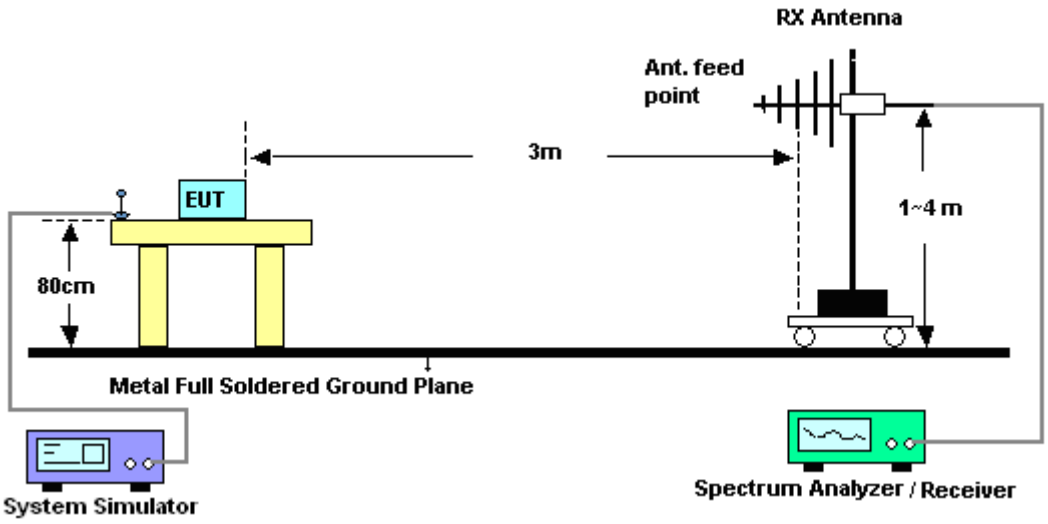
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.1.4 Test Setup

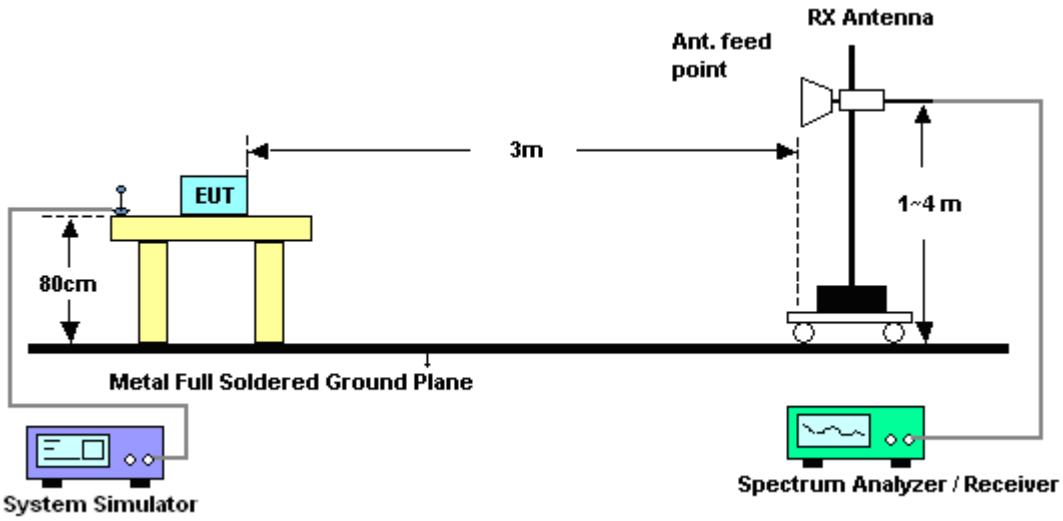
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

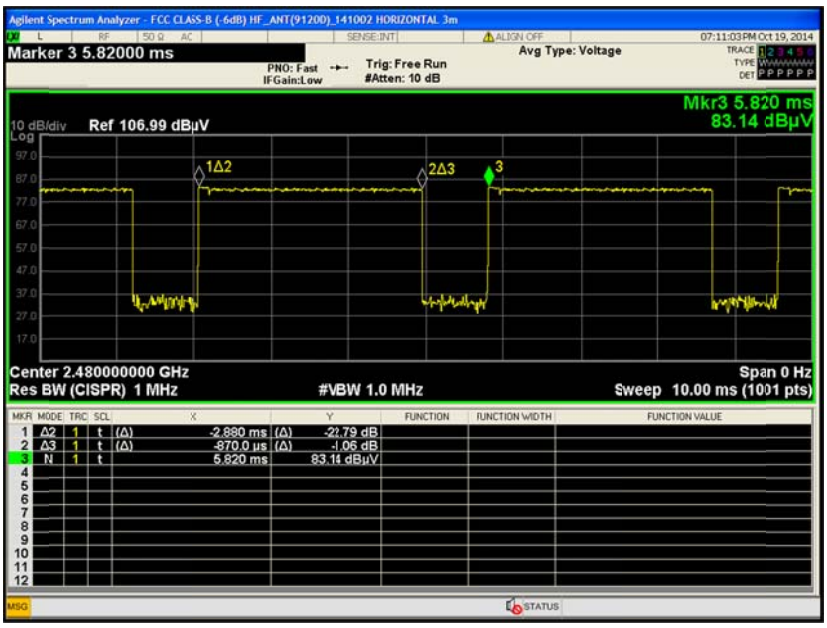


3.1.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

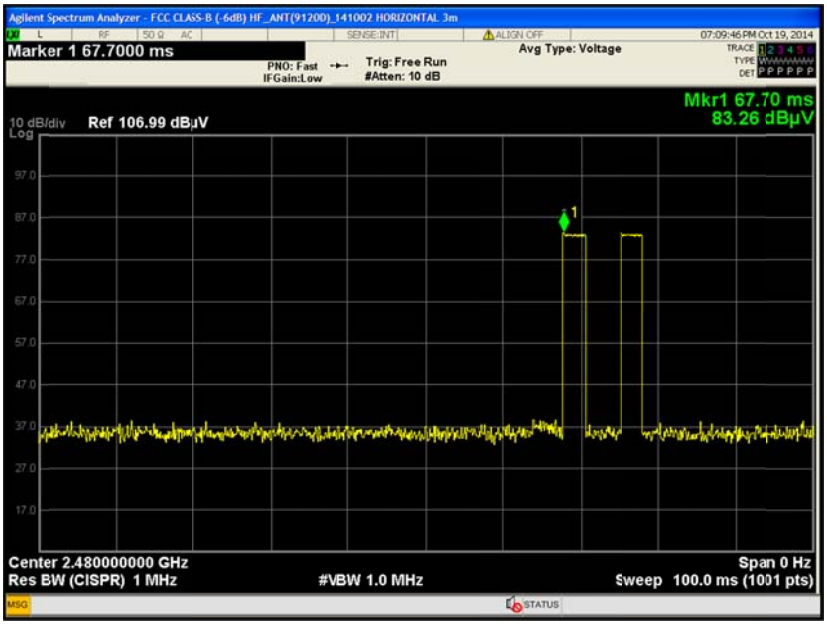
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.1.6 Duty cycle correction factor for average measurement

3DH5 on time (One Pulse) Plot on Channel 39



3DH5 on time (Count Pulses) Plot on Channel 39



Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.88 / 100 = 5.76 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.79 dB
3. 3DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

2.88 ms x 20 channels = 57.6 ms

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. [100ms / 57.6ms] = 2 hops

Thus, the maximum possible ON time:

2.88 ms x 2 = 5.76 ms

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

20 x log(5.76 ms/100ms) = -24.79 dB

3.1.7 Test Result of Radiated Spurious at Band Edges

For Sample 1

Test Mode :	3Mbps	**Temperature :**	24~25°C
Test Channel :	78	**Relative Humidity :**	50~53%
		Test Engineer :	Leo Liao

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
2486.9	46.18	-27.82	74	38.77	27.54	9.5	29.63	100	336	Peak
2486.9	21.39	-32.61	54	-	-	-	-	100	336	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	**Level (dBµV/m)**	**Over Limit (dB)**	**Limit Line (dBµV/m)**	**Read Level (dBµV)**	**Antenna Factor (dB)**	**Cable Loss (dB)**	**Preamp Factor (dB)**	**Ant Pos (cm)**	**Table Pos (deg)**	**Remark**
2484.64	46.19	-27.81	74	38.78	27.54	9.5	29.63	136	332	Peak
2484.64	21.40	-32.60	54	-	-	-	-	136	332	Average

Note: Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79dB)

3.1.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Note: Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

For Sample 1

Test Mode :	3Mbps	**Temperature :**	24~25°C
Test Channel :	78	**Relative Humidity :**	50~53%
Test Engineer :	Leo Liao	**Polarization :**	Horizontal
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30.97	21.32	-18.68	40	32.07	18.4	0.78	29.93	100	52	Peak
104.69	19.42	-24.08	43.5	36.28	11.6	1.48	29.94	-	-	Peak
285.11	22.8	-23.2	46	37.97	12.3	2.46	29.93	-	-	Peak
532.46	21.96	-24.04	46	30.78	17.65	3.45	29.92	-	-	Peak
749.74	25.7	-20.3	46	30.84	20.6	4.19	29.93	-	-	Peak
966.05	26.62	-27.38	54	30.34	21.3	4.92	29.94	-	-	Peak
2480	91.98	-	-	84.57	27.54	9.5	29.63	100	336	Peak
2480	67.19	-	-	-	-	-	-	100	336	Average
4960	42.61	-31.39	74	44.32	31.53	12.95	46.19	118	289	Peak
4960	17.82	-36.18	54	-	-	-	-	118	289	Average
7440	41.42	-32.58	74	37.56	36.16	15.15	47.45	158	273	Peak
7440	16.63	-37.37	54	-	-	-	-	158	273	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79)

Test Mode :	3Mbps	Temperature :	24~25°C
Test Channel :	78	Relative Humidity :	50~53%
Test Engineer :	Leo Liao	Polarization :	Vertical
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
32.91	32.83	-7.17	40	44.65	17.3	0.81	29.93	100	150	Peak
84.32	23.71	-16.29	40	44.96	7.38	1.31	29.94	-	-	Peak
207.51	21.61	-21.89	43.5	40.12	9.32	2.1	29.93	-	-	Peak
391.81	22.85	-23.15	46	34.32	15.58	2.88	29.93	-	-	Peak
748.77	26.51	-19.49	46	31.68	20.57	4.19	29.93	-	-	Peak
959.26	27.27	-18.73	46	31.03	21.29	4.89	29.94	-	-	Peak
2480	88.62	-	-	81.21	27.54	9.5	29.63	136	332	Peak
2480	63.83	-	-	-	-	-	-	136	332	Average
4960	40.83	-33.17	74	47	31.53	8.49	46.19	118	289	Peak
4960	16.04	-37.96	54	-	-	-	-	118	289	Average
7440	40.45	-33.55	74	41.7	36.16	10.04	47.45	158	273	Peak
7440	15.66	-38.34	54	-	-	-	-	158	273	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79)

For Sample 2

Test Mode :	3Mbps	**Temperature :**	24~25°C
Test Channel :	78	**Relative Humidity :**	50~53%
Test Engineer :	Leo Liao	**Polarization :**	Horizontal
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2480	96.11	-	-	88.7	27.54	9.5	29.63	105	347	Peak
2480	71.32	-	-	-	-	-	-	105	347	Average
4960	41.54	-32.46	74	43.25	31.53	12.95	46.19	118	289	Peak
4960	16.75	-37.25	54	-	-	-	-	118	289	Average
7440	41.79	-32.21	74	37.93	36.16	15.15	47.45	158	273	Peak
7440	17	-37	54	-	-	-	-	158	273	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79)

Test Mode :	3Mbps	**Temperature :**	24~25°C
Test Channel :	78	**Relative Humidity :**	50~53%
Test Engineer :	Leo Liao	**Polarization :**	Vertical
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2480	90.79	-	-	83.38	27.54	9.5	29.63	100	328	Peak
2480	66	-	-	-	-	-	-	100	328	Average
4960	41.18	-32.82	74	47.35	31.53	8.49	46.19	118	289	Peak
4960	16.39	-37.61	54	-	-	-	-	118	289	Average
7440	41.11	-32.89	74	42.36	36.16	10.04	47.45	158	273	Peak
7440	16.32	-37.68	54	-	-	-	-	158	273	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79)

For Sample 3

Test Mode :	3Mbps	**Temperature :**	24~25°C
Test Channel :	78	**Relative Humidity :**	50~53%
Test Engineer :	Leo Liao	**Polarization :**	Horizontal
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2480	92.11	-	-	84.7	27.54	9.5	29.63	128	234	Peak
2480	67.32	-	-	-	-	-	-	128	234	Average
4960	42.43	-31.57	74	44.14	31.53	12.95	46.19	118	289	Peak
4960	17.64	-36.36	54	-	-	-	-	118	289	Average
7440	42.95	-31.05	74	39.09	36.16	15.15	47.45	158	273	Peak
7440	18.16	-35.84	54	-	-	-	-	158	273	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79)

Test Mode :	3Mbps	**Temperature :**	24~25°C
Test Channel :	78	**Relative Humidity :**	50~53%
Test Engineer :	Leo Liao	**Polarization :**	Vertical
Remark :	2480 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2480	92.93	-	-	85.52	27.54	9.5	29.63	100	305	Peak
2480	68.14	-	-	-	-	-	-	100	305	Average
4960	41.28	-32.72	74	47.45	31.53	8.49	46.19	118	289	Peak
4960	16.49	-37.51	54	-	-	-	-	118	289	Average
7440	43.45	-30.55	74	44.7	36.16	10.04	47.45	158	273	Peak
7440	18.66	-35.34	54	-	-	-	-	158	273	Average

Note: 1. Other harmonics are lower than background noise.

2. Average Emission Level = Peak Emission Level + duty cycle correction factor(-24.79)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
ESCIO TEST Receiver	R&S	ESCI	100724	9kHz~3GHz	Feb. 21, 2014	Oct. 19, 2014	Feb. 20, 2015	Radiation (03CH01-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	May 26, 2014	Oct. 19, 2014	May 25, 2015	Radiation (03CH01-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 09, 2014	Oct. 19, 2014	May 08, 2015	Radiation (03CH01-SZ)
Bilog Antenna	TESEQ	CBL 6112D	23188	30MHz~2GHz	Oct. 26, 2013	Oct. 19, 2014	Oct. 25, 2014	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 26, 2013	Oct. 19, 2014	Oct. 25, 2014	Radiation (03CH01-SZ)
Double Ridged Horn Antenna	COM-POWER	AH-840	101073	18GHz~40GHz	Jun. 09, 2014	Oct. 19, 2014	Jun. 08, 2015	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3000MHz	Feb. 21, 2014	Oct. 19, 2014	Feb. 20, 2015	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 08, 2014	Oct. 19, 2014	May 07, 2015	Radiation (03CH01-SZ)
AC Source(AVR)	Chroma	61601	616010001985	100Vac~250Vac	Mar. 25, 2014	Oct. 19, 2014	Mar. 24, 2015	Radiation (03CH01-SZ)
Turn Table	EM Electronics	EM 1000	N/A	0~360 degree	NCR	Oct. 19, 2014	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM Electronics	EM 1000	N/A	1 m~4 m	NCR	Oct. 19, 2014	NCR	Radiation (03CH01-SZ)

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.9**

Appendix A. Photographs of EUT

Please refer to Sporton report number EP312203-03 which is issued separately.

Appendix C. Product Equality Declaration

CK TELECOM LTD.

Technology Road.High-Tech Development Zone. Heyuan, Guangdong,P.R.China.
Tel: +86-755-26739633; Fax: +86-755-26739500

Date: November 5, 2014

Product Equality Declaration

We, **CK TELECOM LTD.,** declare on our sole responsibility for the product of **Doro PhoneEasy 626** below:

s

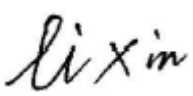
The differences between previous and current model of **Doro PhoneEasy 626** are as below:

1. Add a new USB cable “HYD-CK-0851”
2. Changed Camera module, Mic, Speaker, USB connector, Speaker audio PA IC
3. SW Changed from SHUTTLE-S13A_DORO626_L3EN_111_140224 to SHUTTLE-S13A_DORO626_L3EN_300_140909

Except listings above, the others are all the same as previous version.

Should you have any questions or comments regarding this matter, please have my best attention.

Sincerely yours,



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