

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT**INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

Product Name: PDA Phone H-22

Brand Name: OPTICON

Model Name: H22-EU-QWERTY-1D-RFID(Configuration 1)
H22-EU-QWERTY-2D-RFID(Configuration 2)
H22-EU-NUM-1D-RFID(Configuration 5)
H22-EU-NUM-2D-RFID(Configuration 6)

Model Differences: Please see page 6

FCC ID: Q2Q-H22-RFID

Report No.: EH/2010/B0048

Issue Date: Sep. 06, 2011

FCC Rule Part: §15.225

Prepared for: Opticon Sensors Europe B.V.
Opaallaan 35 2132 XV Hoofddorp Netherlands

Prepared by: SGS Taiwan Ltd.
Electronics & Communication Laboratory
No. 134, Wu Kung Rd., Wuku Industrial Zone,
Taipei County, Taiwan



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VERIFICATION OF COMPLIANCE

Applicant: Opticon Sensors Europe B.V.
Opaallaan 35 2132 XV Hoofddorp Netherlands

Product Name: PDA Phone H-22

FCC ID: Q2Q-H22-RFID

Brand Name: OPTICON

Model No.: Please see page 1

Model Difference: Please see page 6

File Number: EH/2010/B0048

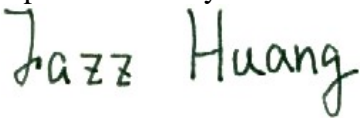
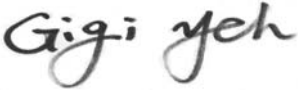

Date of Test: Apr. 29, 2010 ~ Aug. 25, 2011

Date of EUT Received: Apr. 29, 2010

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.225.

The test results of this report relate only to the tested sample identified in this report

Test By:	 <hr/> <i>Jazz Huang / Engineer</i>	Date:	<hr/> Sep. 05, 2011
Prepared By:	 <hr/> <i>Gigi Yeh / Clerk</i>	Date:	<hr/> Sep. 05, 2011
Approved By:	 <hr/> <i>Jim Chang / Supervisor</i>	Date:	<hr/> Sep. 05, 2011

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Version

Version No.	Date	Description
00	Sep. 05, 2011	Initial creation of document

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1 GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	PDA Phone H-22	
Brand Name:	OPTICON	
Model No.:	Please see page 1	
Model Difference:	Please see page 6	
Data Cable	Model No.: MICRO USB CABLE L=750MM, Supplier: WANSHIH ELECTRONIC CO., LTD N	
Power Supply	3.7Vdc Lithium Ion battery or 5Vdc by AC/DC power adapter	
	Battery:	Model No.: LBP-02 (H-21) BATTERY PACK, Supplier: TD HiTech Energy Inc
	Adapter:	Model No.: DSA-12CA-05 050200, Supplier: DEE VAN ENTERPRISE CO., LTD.

RFID:

Operating Frequency	13.56MHz
Transmit Power	< 123dBuV/m at 3m.
Number of Channels	1
Operating Mode	Point-to-Point
Antenna Type	Print antenna
Module Type	ASK

The EUT is compliance with RFID Standard.


This report applies for RFID.

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Model different declaration



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電話：(02)22993279 傳真：(02)22999489

Product Diversity Description Table

1. Applicant's name:
2. Original Model No.: H22-EU-QWERTY-2D-RFID (Configuration 2)
H22-EU-NUM-1D (Configuration 7)
3. Series Model No.: H22-EU-QWERTY-1D-RFID (Configuration 1)
H22-EU-NUM-1D-RFID (Configuration 5)
H22-EU-NUM-2D-RFID (Configuration 6)
H22-EU-QWERTY-1D (Configuration 3)
H22-EU-QWERTY-2D (Configuration 4)
H22-EU-NUM-2D (Configuration 8)
4. Diversity Description:
 1. Circuit Diagram: No
 Yes,
The Keypad, barcode and RFID are difference.
 2. PCB Layout: No
 Yes, please list.
 3. Internal Component: No
 Yes,
The Keypad, barcode and RFID are difference.
 4. Appearance: No
 Yes,
The Keypad, barcode and RFID are difference.
 5. Function/Capability: No
 Yes, please list.
The Configuration 1/2/5/6 with RFID
The Configuration 3/4/7/8 without RFID
 6. Others: No
 Yes,

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5. Applicant's Signature

[Handwritten Signature]

6. Date:

2011/8/31

7. Supplement for the model information

	Config 1	Config 2	Config 3	Config 4	Config 5	Config 6	Config 7	Config 8
RFID	v	v			v	v		
Keypad Type	Qwerty	Qwerty	Qwerty	Qwerty	Numeric	Numeric	Numeric	Numeric
Barcode Type	1D	2D	1D	2D	1D	2D	1D	2D

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1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: Q2Q-H22-RFID** filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure..

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003) and RSS-Gen: 2007.. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

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2 System Test Configuration

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 which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table 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 max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

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2.4 Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB (uV)	
	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

Note

- 1.The lower limit shall apply at the transition frequencies
- 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

(2) Radiated Emission

- a. The field strength of any emission within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- b. Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- c. Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- d. The field strength of any emissions appearing outside of the 13.110-14.010 MHz shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit).as below.

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance (m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

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- Remark:
1. Emission level in $\text{dBuV/m} = 20 \log(\text{uV/m})$
 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205 & RSS210 2.2.7
 4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ 15.205 & RSS210 2.2.7, then the general radiated emission limits in ξ 15.209 & RSS210 2.2.7

(3) Frequency Tolerance

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of 5 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

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2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

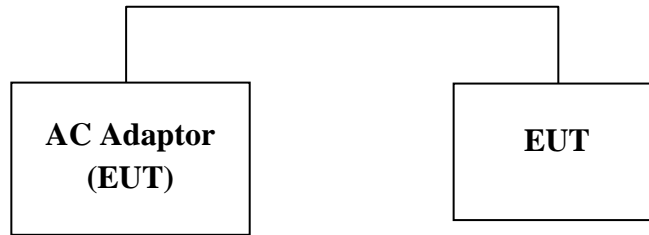


Table 2-1 Equipment Used in Tested System

Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.
Adaptor	DEE	DSA-12CA-05 050200,	N/A	N/A

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3 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207 & RSS-Gen §7.2.2	Conducted Emission	Compliant
§15.225 (a), (d) & RSS210 2.2.7	Radiated Emission	Compliant
§15.225 (e) & RSS210 Annex 2 A2.6	Frequency Stability	Compliant

4 Description of test modes

The EUT stay in continuous transmitting mode. The frequency 13.56 MHz is chosen for radiated emission testing.

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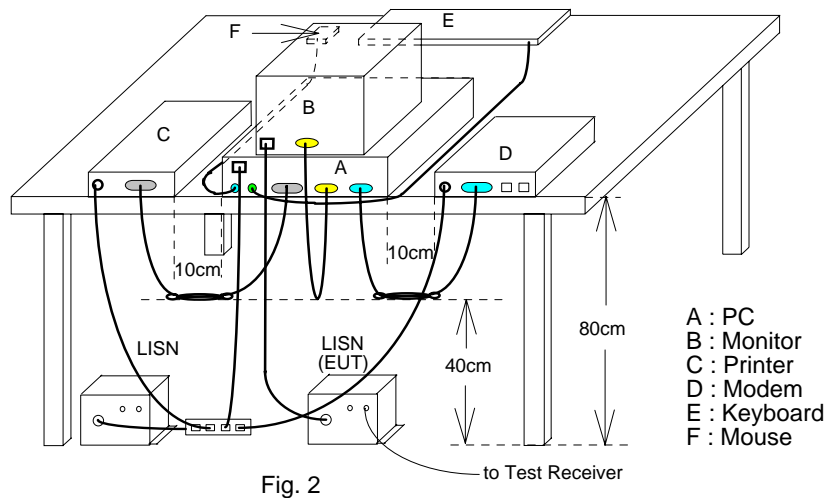
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5 Conducted Emissions Test

5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)



5.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	828985/004	09/23/2010	09/22/2012
LISN	Rolf-Heine	NNB-2/16Z	99012	03/31/2011	03/30/2012
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/31/2011	03/30/2012
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2010	11/27/2011

5.4 Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peak.

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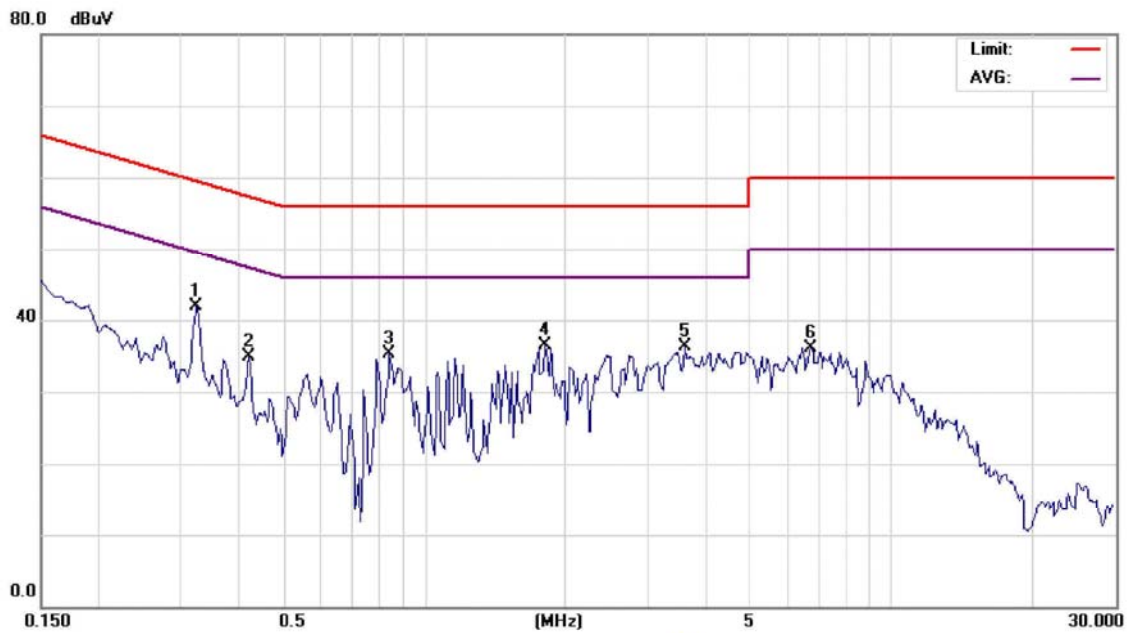
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AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	RFID Operation Mode		Test Date:	Aug. 26, 2011	
Temperature:	23 °C	Humidity:	61 %	Test By:	Jazz



Site	SGS CONDUCTED #1	Phase:	L1	Temperature:	23 °C
Limit:	FCC Class B Conduction(QP)	Power:	AC 120V/60Hz	Humidity:	61%
EUT:	PDAPhone	Distance:		Air Pressure:	hpa
M/N:	H-22				
Note:	RFID				

No.	Mk.	Freq.	Reading Level	Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.3250	41.80	0.11	41.91	59.58	-17.67	peak	
2		0.4200	34.84	0.12	34.96	57.45	-22.49	peak	
3		0.8400	35.16	0.11	35.27	56.00	-20.73	peak	
4		1.8100	36.27	0.14	36.41	56.00	-19.59	peak	
5		3.6200	36.17	0.17	36.34	56.00	-19.66	peak	
6		6.7600	35.87	0.26	36.13	60.00	-23.87	peak	

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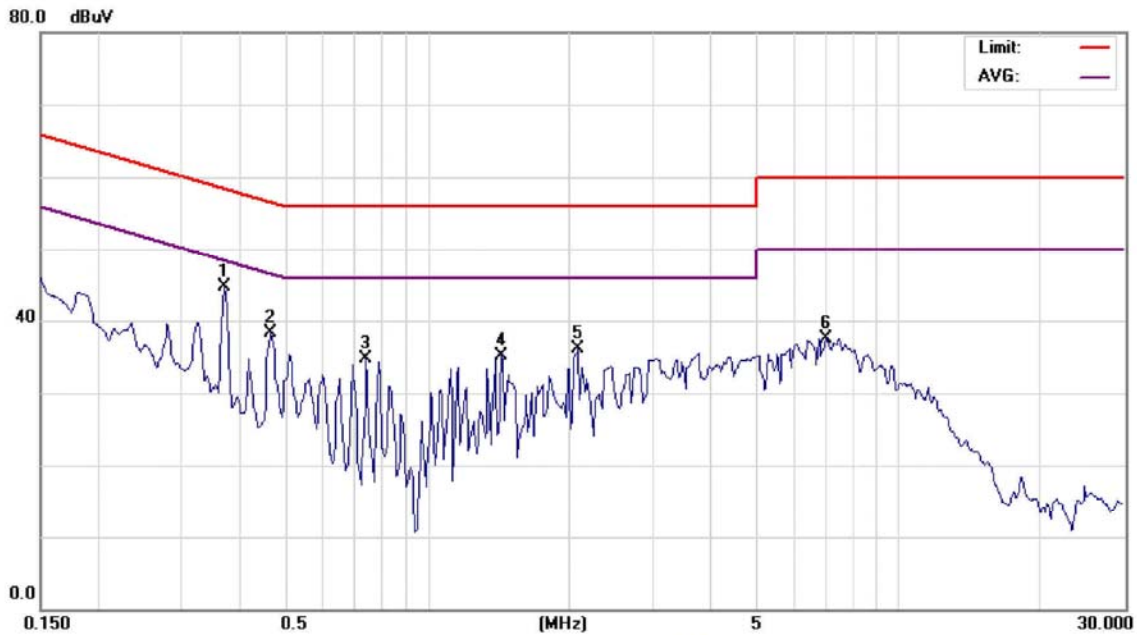
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Site	SGS CONDUCTED #1	Phase:	N	Temperature:	23 °C
Limit:	FCC Class B Conduction(QP)	Power:	AC 120V/60Hz	Humidity:	61%
EUT:	PDAPhone	Distance:		Air Pressure:	hpa
M/N:	H-22				
Note:	RFID				

No.	Mk.	Freq. MHz	Reading Level dBuV	Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.3700	44.52	0.16	44.68	58.50	-13.82	peak	
2		0.4650	38.11	0.16	38.27	56.60	-18.33	peak	
3		0.7400	34.54	0.15	34.69	56.00	-21.31	peak	
4		1.4400	35.04	0.16	35.20	56.00	-20.80	peak	
5		2.0900	35.84	0.18	36.02	56.00	-19.98	peak	
6		7.0600	37.26	0.31	37.57	60.00	-22.43	peak	

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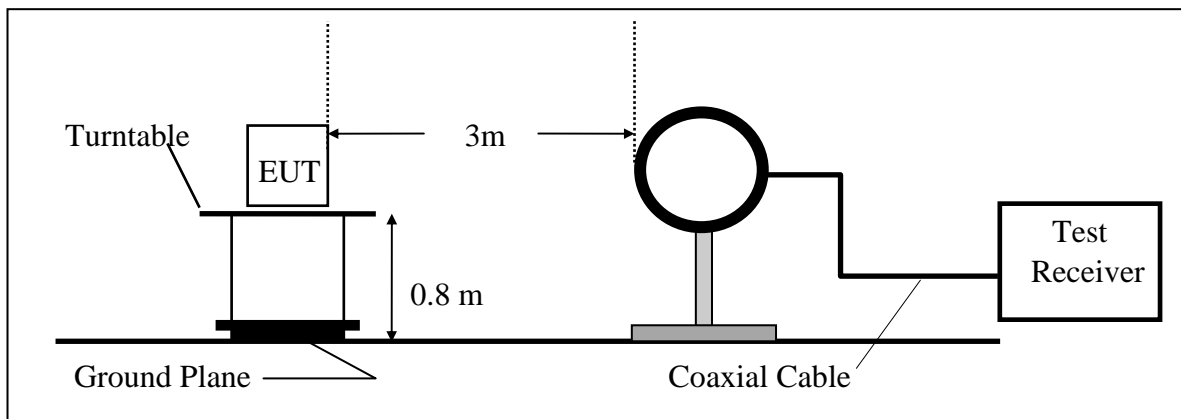
6 Radiated Emission Test

6.1 Measurement Procedure

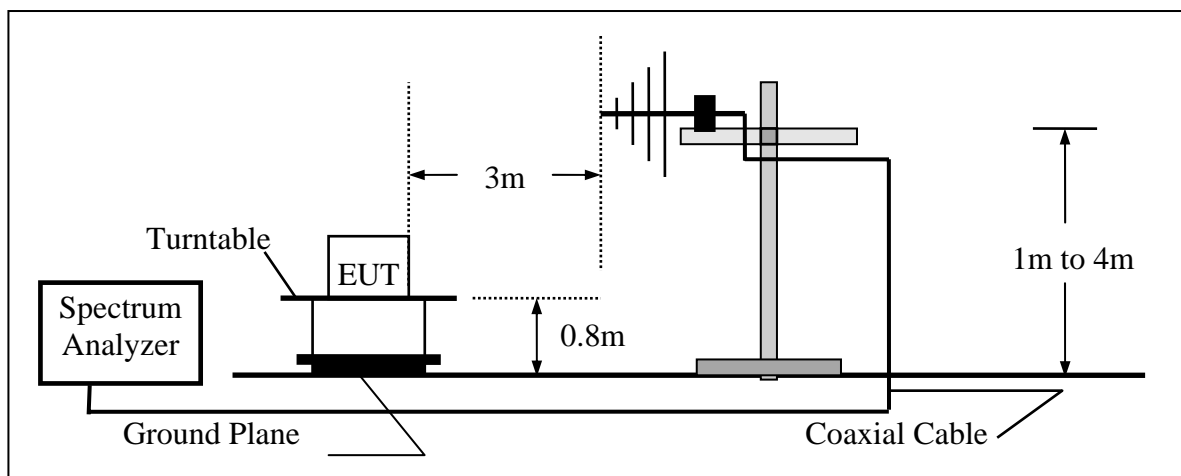
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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6.3 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	03/30/2011	03/29/2012
Bilog Antenna	SCHWAZBECK	VULB9160	3136	11/19/2010	11/18/2011
Loop antenna	MESSTEC	FLA30	03/10086	06/05/2011	06/04/2013
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2010	11/27/2011
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2011	01/04/2012
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2011	01/04/2012
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2011	01/04/2012
3m Site	SGS	966 chamber	N/A	09/06/2010	09/05/2011

6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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6.5 Measurement Result

Operation Mode: Transmitting Mode
 Fundamental Frequency: 13.56 MHz
 Temperature : 25 °C
 Humidity : 65 %

Test Date : Aug. 26, 2011
 Test By: Jazz
 Pol: Vertical

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/AV/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit@3m (dBuV/m)	Safe Margin (dB)	Note
13.56	V	Peak	58.21	-4.76	53.45	123.99	-70.54	F
27.12	V	Peak	--					
40.68	V	Peak	--					
54.24	V	Peak	--					
67.80	V	Peak	--					
81.36	V	Peak	--					
94.92	V	Peak	--					
108.48	V	Peak	--					
122.04	V	Peak	--					
135.60	V	Peak	--					
47.46	V	Peak	40.46	-13.85	26.61	40.00	-13.39	E
144.46	V	Peak	44.45	-12.66	31.79	43.50	-11.71	E
233.70	V	Peak	38.64	-14.32	24.32	46.00	-21.68	E
393.75	V	Peak	31.28	-11.00	20.28	46.00	-25.72	E
636.25	V	Peak	32.91	-6.24	26.67	46.00	-19.33	E
793.39	V	Peak	29.61	-3.73	25.88	46.00	-20.12	E

Remark :

- (1) Measuring frequencies from 25 MHz to the 1GHz °
- (2) Radiated emissions measured in frequency range from 25 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA between 25MHz to 30MHz was 10KHz; 30MHz to 1GHz was 100KHz.

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Operation Mode: Transmitting Mode
 Fundamental Frequency: 13.56 MHz
 Temperature : 25 °C
 Humidity : 65 %

Test Date : Aug. 26, 2011
 Test By: Jazz
 Pol: Horizontal

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/AV/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit@3m (dBuV/m)	Safe Margin (dB)	Note
13.56	H	Peak	60.71	-4.76	55.95	123.99	-68.04	F
27.12	H	Peak	--					
40.68	H	Peak	--					
54.24	H	Peak	--					
67.80	H	Peak	--					
81.36	H	Peak	--					
94.92	H	Peak	--					
108.48	H	Peak	--					
122.04	H	Peak	--					
135.60	H	Peak	--					
144.46	H	Peak	41.39	-12.66	28.73	43.50	-14.77	E
233.70	H	Peak	42.42	-14.32	28.10	46.00	-17.90	E
285.11	H	Peak	34.44	-12.81	21.63	46.00	-24.37	E
507.24	H	Peak	31.31	-8.98	22.33	46.00	-23.67	E
623.64	H	Peak	33.93	-6.51	27.42	46.00	-18.58	E
779.81	H	Peak	32.25	-3.86	28.39	46.00	-17.61	E

Remark :

- (1) Measuring frequencies from 25 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 25 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) The IF bandwidth of SPA between 25MHz to 30MHz was 10KHz; 30MHz to 1GHz was 100KHz.

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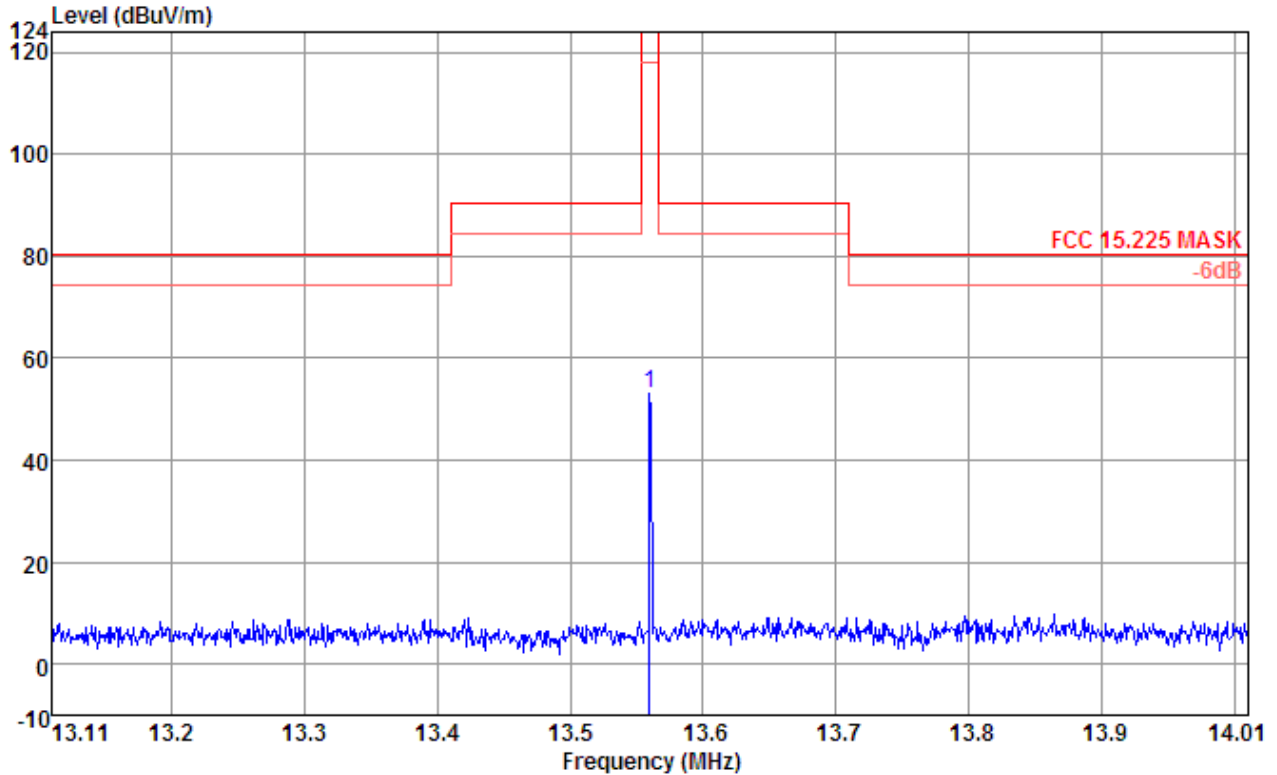
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Radiated Mask



Site : 966 Chamber
 Condition : FCC 15.225 MASK FLA30 VERTICAL
 Project No. : EH/2010/B0046-51
 Applicant : 英華達
 EUT Description: PDA Phone
 EUT Model : H-22
 Test Mode : TX 13.56 Mask
 Temp./Humid. : 25/65
 Operator : Lion
 : H Plan

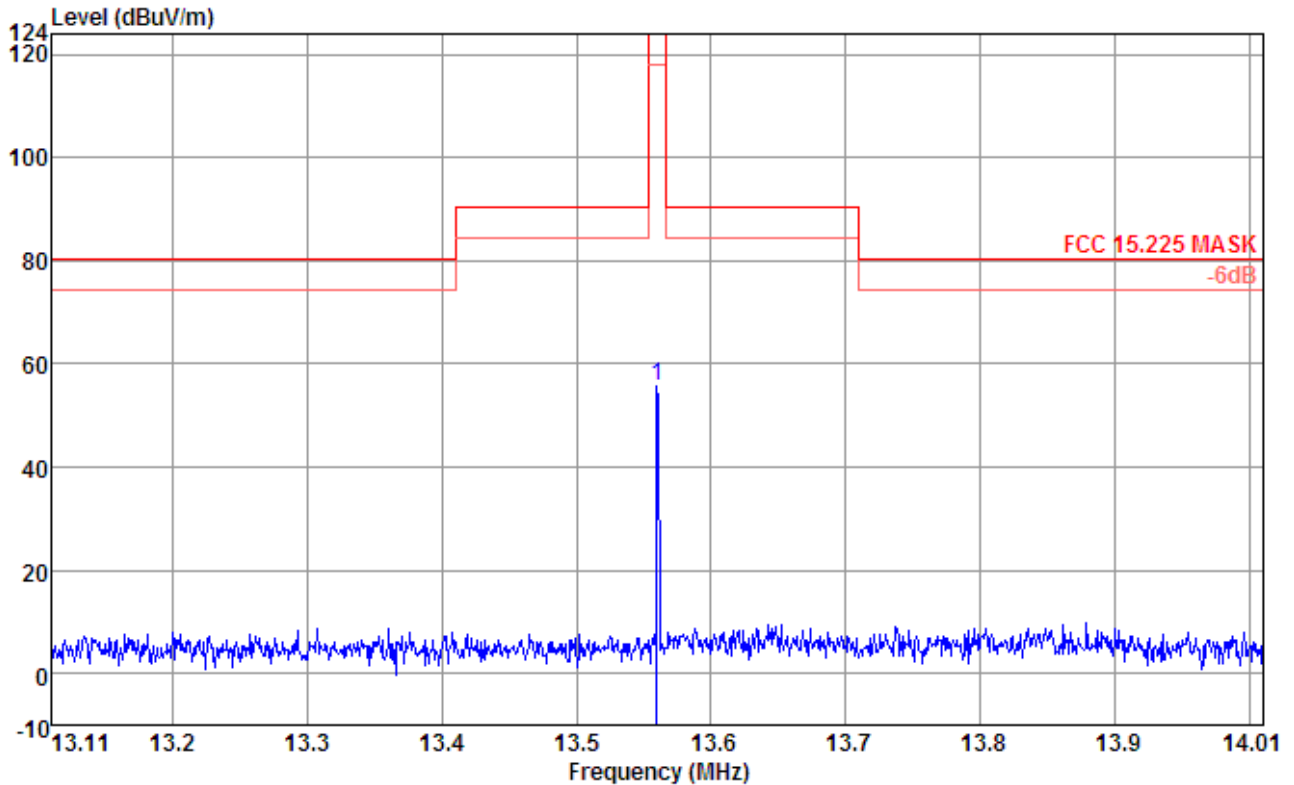
	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Factor	Level	Limit	Over	Remark
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1 p	13.56	57.71	22.82	27.84	0.26	-4.76	52.95	124.00	-71.05	Peak

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Radiated Mask



Site : 966 Chamber
 Condition : FCC 15.225 MASK FLA30 HORIZONTAL
 Project No. : EH/2010/B0046-51
 Applicant : 英華達
 EUT Description: PDA Phone
 EUT Model : H-22
 Test Mode : TX 13.56 Mask
 Temp./Humid. : 25/65
 Operator : Lion
 : H Plan

	Read	Antenna	Preamp	Cable		Limit	Over		
Freq	Level	Factor	Factor	Loss	Factor	Level	Line	Limit	
MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB	
1 p	13.56	60.51	22.82	27.84	0.26	-4.76	55.75	124.00	-68.25 Peak

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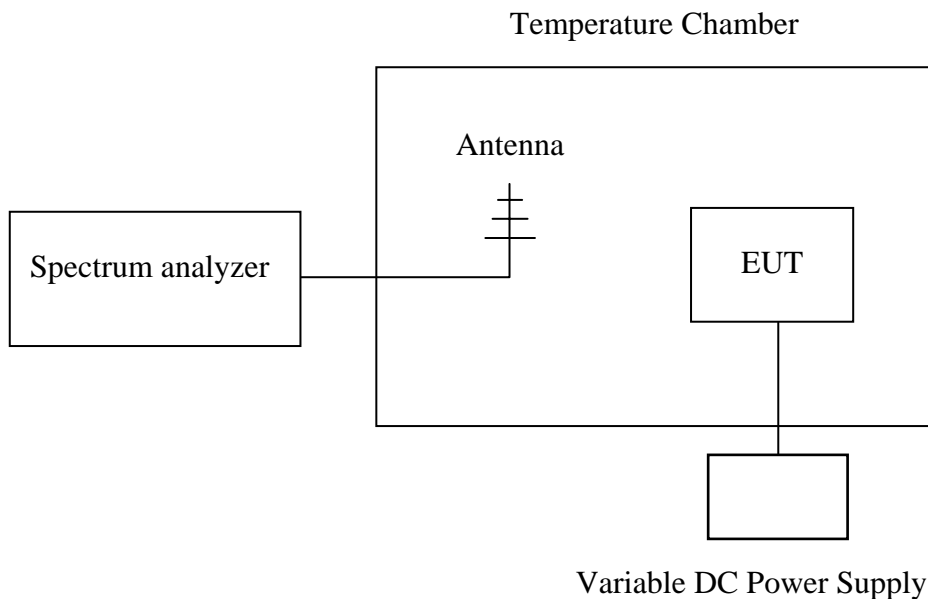
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7 Frequency Tolerance

7.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 1K, Span =30K.
4. Set SPA Max hold. Mark peak, -26dB.

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Equipment Used:

Same as 6.2 Radiated Emission Measurement.

7.4 Measurement Results

Refer to attached data chart.

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A. Temperature Variation

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
V	Temperature (°C)	(MHz)		
3.7	-20	13.560318	-18.00	+/- 1.356
3.7	-10	13.560314	-14.00	+/- 1.356
3.7	0	13.560311	-11.00	+/- 1.356
3.7	10	13.560308	-8.00	+/- 1.356
3.7	20	13.560300	0.00	+/- 1.356
3.7	30	13.560332	-32.00	+/- 1.356
3.7	40	13.560338	-38.00	+/- 1.356
3.7	50	13.560346	-46.00	+/- 1.356

B. Supply Voltage Variation

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
V	Temperature (°C)	(MHz)		
4.2	20	13.560322	-22.00	+/- 1.356
3.7	20	13.560300	0.00	+/- 1.356
3.5	20	13.560316	-16.00	+/- 1.356

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8. 99% OCCUPIED BANDWIDTH MEASUREMENT

8.1 Test Set-up:

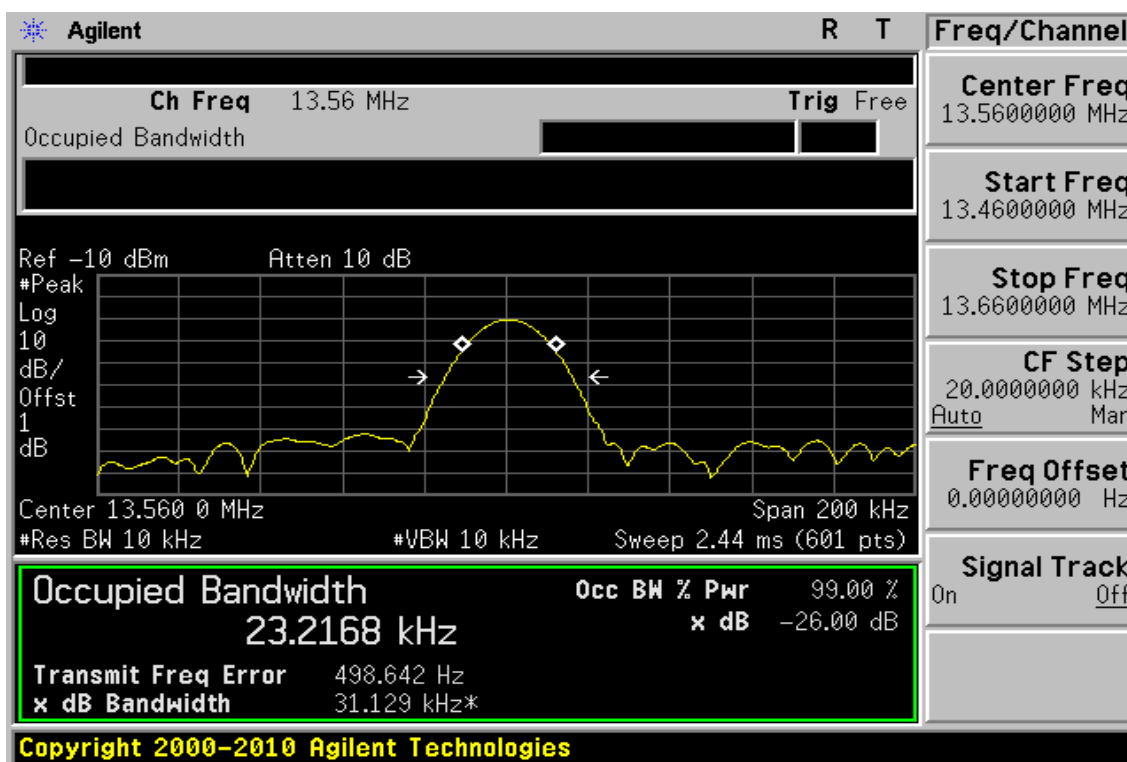
Refer to section 6.2 in this report

8.2 Measurement Procedure:

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW (10KHz) was set to about 1% of emission BW, VBW= 3 times RBW(10KHz), -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

8.3 Measurement Equipment Used:

Refer to section 6.3 in this report



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