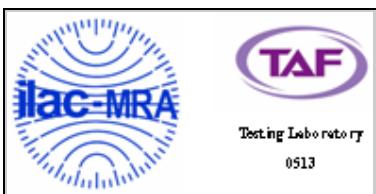


ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: Personal Digital Assistant
Brand Name: Olympus
Model Name: MAJ-1901
Model Differences: N/A
FCC ID: RKS-MAJ1901
Report No.: ER/2010/20004
Issue Date: Mar. 12, 2010
FCC Rule Part: §15.225
Prepared for: Olympus Technologies Singapore Pte Ltd
41 Science Park Road #04-17/18 The Gemini
Singapore 117610
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: Olympus Technologies Singapore Pte Ltd
41 Science Park Road #04-17/18 The Gemini Singapore 117610

Product Name: Personal Digital Assistant

FCC ID: RKS-MAJ1901

Brand Name: Olympus

Model No.: MAJ-1901

Model Difference: N/A

File Number: ER/2010/20004

Date of Test: Mar. 6, 2010 ~ Mar. 11, 2010

Date of EUT Received: Mar. 5, 2010

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. 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:

Date:

Mar. 12, 2010

Jason Wu / Asst. Supervisor

Prepared By:

Date:

Mar. 12, 2010

Tiffany Kao / Clerk

Approved By

Date:

Mar. 12, 2010

Vincent Su / Manager

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FCC ID: RKS-MAJ1901

Report No: ER/2010/20004

Issue Date: Mar. 12, 2010

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Version

Version No.	Date	Description
00	Mar. 12, 2010	Initial creation of document

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1. GENERAL INFORMATION

1.1 Product Description

Product Name:	Personal Digital Assistant	
Brand Name:	Olympus	
Model Name:	MAJ-1901	
Model Difference:	N/A	
Power Supply:	3.7Vdc from Li-ion battery or 5Vdc from Cradle	
Power Supply:	Battery:	Manufacturer: OLYMPUS MEDICAL SYSTEMS CORP
	Cradle:	Model No: MAJ-1903
Power Supply:	Cradle:	Manufacturer: OLYMPUS MEDICAL SYSTEMS CORP
		Model No: MAJ-1902

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WLAN:

Frequency Range & Channel number:	802.11 b/g: 2412 – 2462 MHz, 11 channels	
Rated Power:	802.11 b: 18.70 dBm 802.11 g: 18.11 dBm	
Modulation type:	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM	
Transmission Rate:	802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps	
Antenna Designation:	2.4 G Antenna	Type: PIFA Gain: 3.8 dBi
Type of Emission:	17M3D1D	
Original Modular Report:	Lab Issued: Advance Data Technology Corporation Report No: RF95033L08A	

RFID:

Operating Frequency	13.56MHz
Transmit Power	< 124dBuV/m at 3m.
Number of Channels	1
Operating Mode	Point-to-Point
Antenna Type	A permanently flexible PCB Coil antenna, which is built-In, designed as an indispensable part of the EUT.
Module Type	ASK (Transmission) / FSK (Reception)

The EUT is compliance with RFID Standard.

This report applies for RFID.

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1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **RKS-MAJ1901** filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is in 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). 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-1.

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 μV/m	Distance (m)	Field strength at 3m dBμV/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 dBuV/m=20 log (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
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ 15.205, then the general radiated emission limits in ξ 15.209 apply.

(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 -20 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

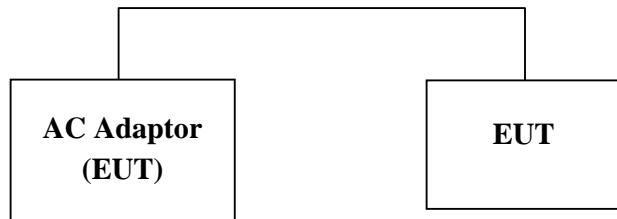


Table 2-1 Equipment Used in Tested System

Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.
N/A				

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3 Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	Compliant
§15.225 (a),(b),(c),(d)	Radiated Emission	Compliant
§15.225 (e)	Frequency Stability	Compliant

4 Description of test modes

The EUT stay in continuous transmitting mode and the EUT staying in continuous transmitting mode. The Frequency 13.56 MHz is chosen for testing.

The X, Y and Z-axis of EUT were pre-test; Y mode will be the worse case for this test report.

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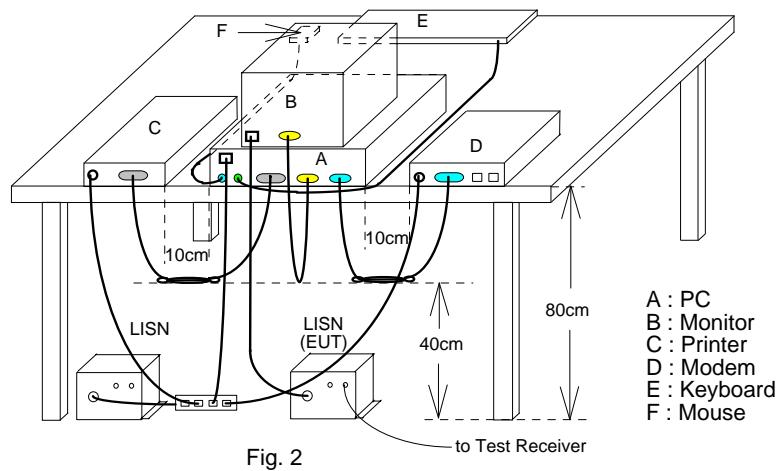
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5 Conducted Emissions Test

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	09/15/2009	09/14/2010
LISN	Rolf-Heine	NNB-2/16Z	99012	02/02/2010	02/01/2011
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/02/2010	02/01/2011
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2009	11/27/2010

5.4 Measurement Result:

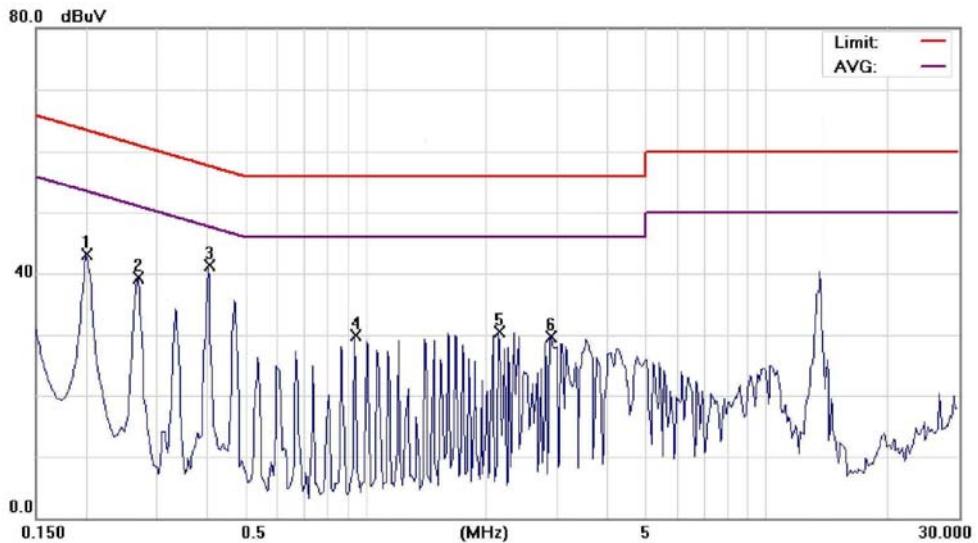
The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peak.

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AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	RFID Operation Mode			Test Date:	Mar. 08, 2010
Temperature:	23°C	Humidity:	58 %	Test By:	Jason



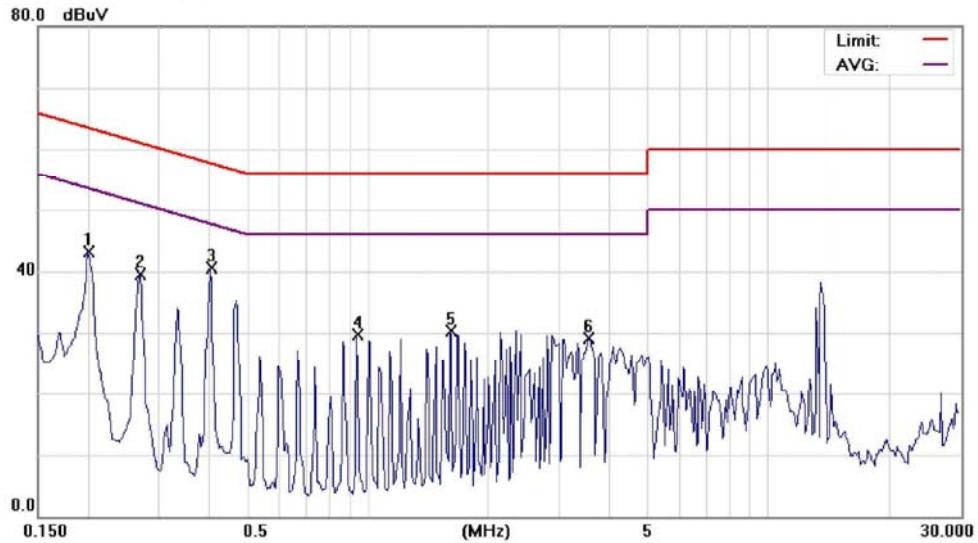
Site: SGS CONDUCTED #1 Phase: **L1** Temperature: 23 °C
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 58 %
 EUT: Personal Digital Assistant Distance:
 M/N: MAJ-1901 For PDA Air Pressure: hpa
 Note: RFID Operation

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over						
							MHz	dBuV	dB	dBuV	dB	Detector	Comment
1		0.2000	43.02	0.12	43.14	63.61	-20.47	peak					
2		0.2700	39.13	0.11	39.24	61.12	-21.88	peak					
3 *		0.4050	41.23	0.08	41.31	57.75	-16.44	peak					
4		0.9400	29.73	0.09	29.82	56.00	-26.18	peak					
5		2.1500	30.35	0.13	30.48	56.00	-25.52	peak					
6		2.8900	29.66	0.14	29.80	56.00	-26.20	peak					

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Operation Mode:	RFID Operation Mode			Test Date:	Mar. 08, 2010
Temperature:	23°C	Humidity:	58 %	Test By:	Jason



Site: SGS CONDUCTED #1 Phase: **N** Temperature: 23 °C
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 58 %
 EUT: Personal Digital Assistant Distance: Air Pressure: hpa
 M/N: MAJ-1901 For PDA
 Note: RFID Operation

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment		Limit	Over	Detector	Comment
					MHz	dBuV	dB	dBuV	dB	
1		0.2000	42.98	0.14	43.12	63.61	-20.49		peak	
2		0.2700	39.29	0.13	39.42	61.12	-21.70		peak	
3 *		0.4050	40.40	0.11	40.51	57.75	-17.24		peak	
4		0.9400	29.51	0.12	29.63	56.00	-26.37		peak	
5		1.6100	30.22	0.14	30.36	56.00	-25.64		peak	
6		3.5600	29.03	0.17	29.20	56.00	-26.80		peak	

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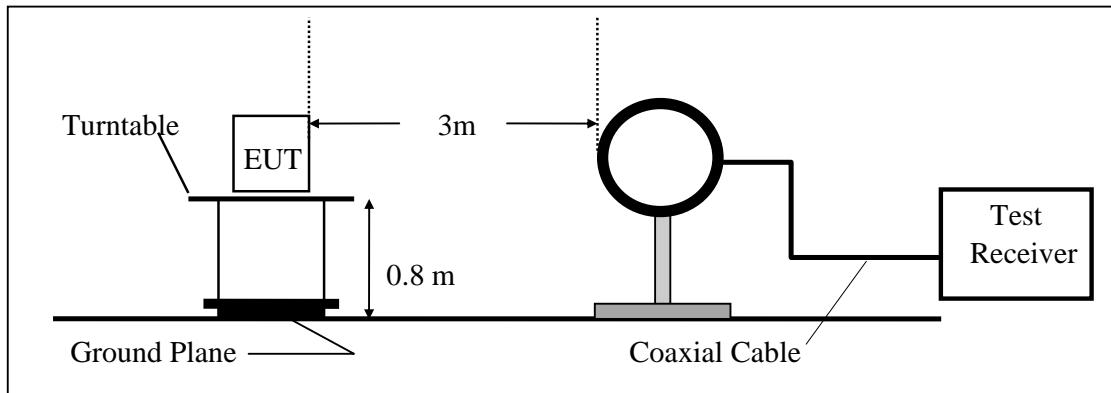
6 Radiated Emission Test

6.1 Measurement Procedure

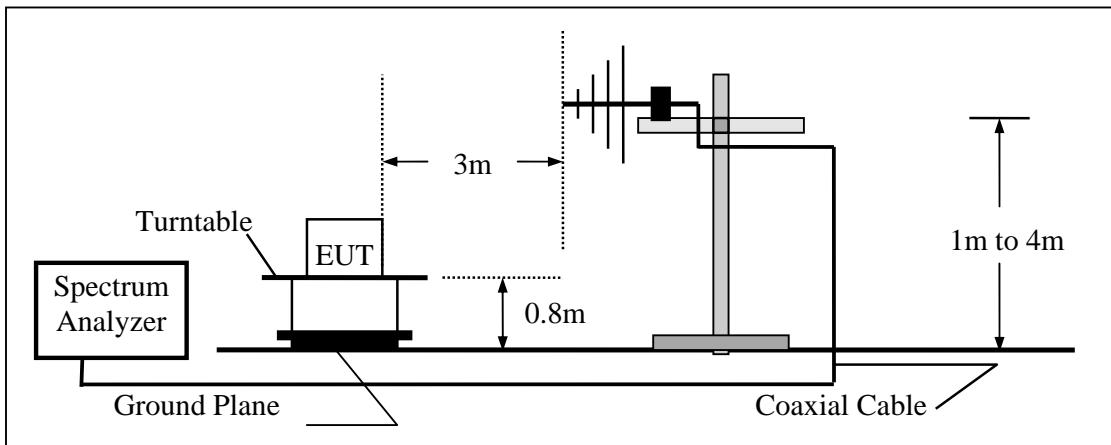
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above 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	02/12/2010	02/11/2011
Bilog Antenna	SCHWAZBECK	VULB9160	3136	11/19/2009	11/18/2010
Horn antenna	SCHWAZBECK	BBHA 9120D	9120D-673	05/09/2008	05/08/2010
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2009	11/28/2010
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2010	01/04/2011
Radio Communication Analyzer	R & S	CMU200	102189	05/13/208	05/12/2010
Radio Communication Analyzer	Anritsu	MT8820A	6200307563	04/16/2008	04/15/2010
DC Block	Agilent	BLK-18	155452	07/05/2009	07/04/2010
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	01/05/2010	01/04/2011
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2010	01/04/2011
3m Site	SGS	966 chamber	N/A	11/08/2009	11/09/2010

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 : Mar. 08, 2010
Test By: Jason
Pol: Vertical

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK)	Detector			Limit@3m (dBuV/m)	Safe Margin (dB)	Note
			Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)			
13.56	V	Peak	86.38	-5.30	81.08	123.99	-42.91	F
27.12	V	Peak	34.88	-0.22	34.66	69.54	-34.88	H
104.69	V	Peak	44.73	-16.63	28.10	43.50	-15.40	E
256.98	V	Peak	38.32	-13.67	24.65	46.00	-21.35	E
429.64	V	Peak	36.27	-9.14	27.13	46.00	-18.87	E
664.38	V	Peak	36.57	-5.01	31.56	46.00	-14.44	E
725.49	V	Peak	37.99	-4.67	33.32	46.00	-12.68	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 : Mar. 08, 2010
Test By: Jason
Pol: Horizontal

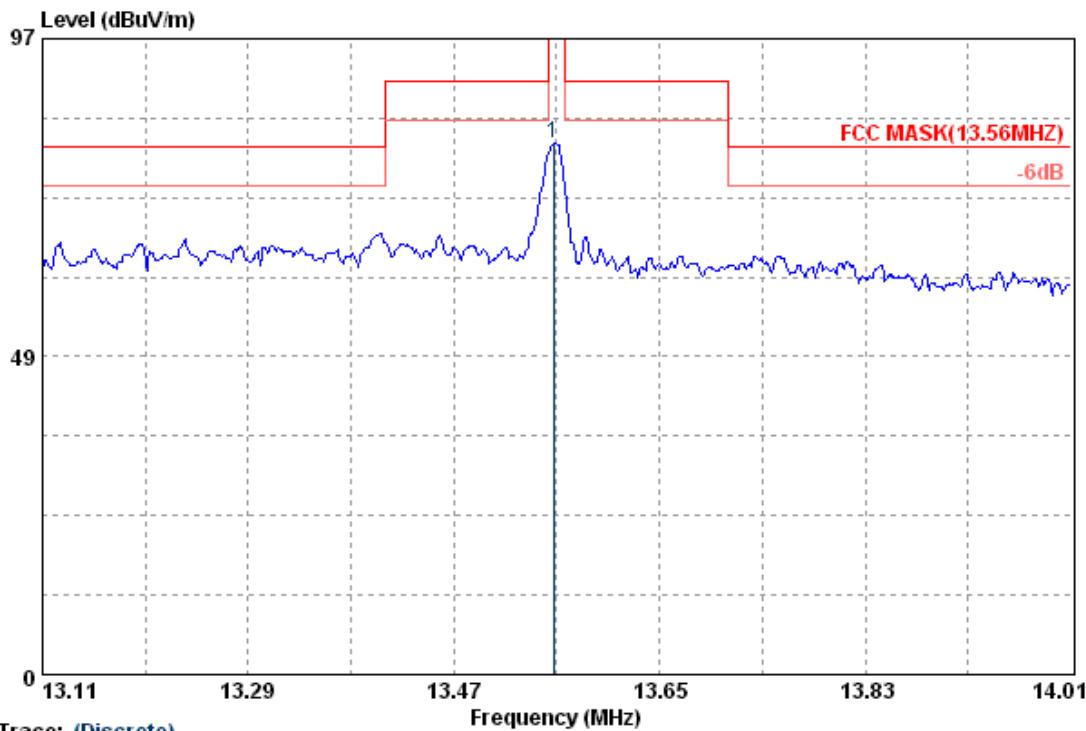
Freq. (MHz)	Ant.Pol. H/V	Detector		Factor (dB)	Actual FS (dBuV/m)	Limit@3m (dBuV/m)	Safe Margin (dB)	Note
		Mode (PK/AV/QP)	Reading (dBuV)					
13.56	H	Peak	79.42	-5.30	74.12 0.00	123.99	-49.87	F
27.12	H	Peak	32.15	-0.22	31.93	69.54	-37.61	H
58.13	H	Peak	40.80	-14.66	26.14	40.00	-13.86	E
208.48	H	Peak	40.13	-15.32	24.81	43.50	-18.69	E
256.98	H	Peak	39.02	-13.67	25.35	46.00	-20.65	E
390.84	H	Peak	37.99	-10.31	27.68	46.00	-18.32	E
882.63	H	Peak	33.42	-1.42	32.00	46.00	-14.00	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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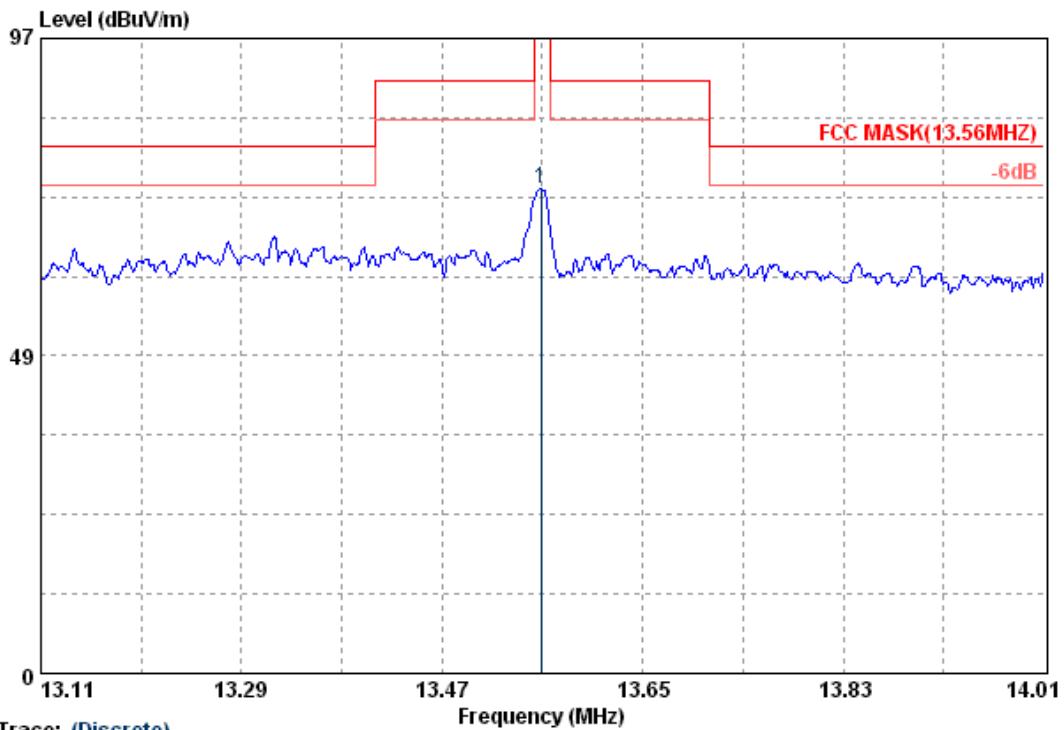
Radiated Mask Vertical

Condition : FLA30 VERTICAL
Project No. : ER/2010/20002
Applicant : Olympus
EUT Description : Personal Digital Assistant(M3)
EUT Model : MAJ-1901
Test Mode : Y Plan//Tx Mode//Mask
Temp./Humid. : 25/65
Operator : Jason

	Read	Antenna	Preamp	Cable	Limit	Over	Line	Limit	Remar
	Freq	Level	Factor	Factor	Loss	Factor	Level	dBuV/m	dB
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB
1 @	13.56	86.38	22.82	28.50	0.38	-5.30	81.08	124.00	-42.92 Peak

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Radiated Mask Horizontal

Condition : FLA30 HORIZONTAL
Project No. : ER/2010/20002
Applicant : Olympus
EUT Description : Personal Digital Assistant(M3)
EUT Model : MAJ-1901
Test Mode : Y Plan //Tx Mode //Mask
Temp./Humid. : 25/65
Operator : Jason

	Read	Antenna	Preamp	Cable	Limit	Over			
	Freq	Level	Factor	Factor	Loss	Factor	Line	Limit	Over
	MHz	dBuV	dB/m	dB	dB	dB/m	dBuV/m	dBuV/m	dB
1 @	13.56	79.42	22.82	28.50	0.38	-5.30	74.12	124.00	-49.88 Peak

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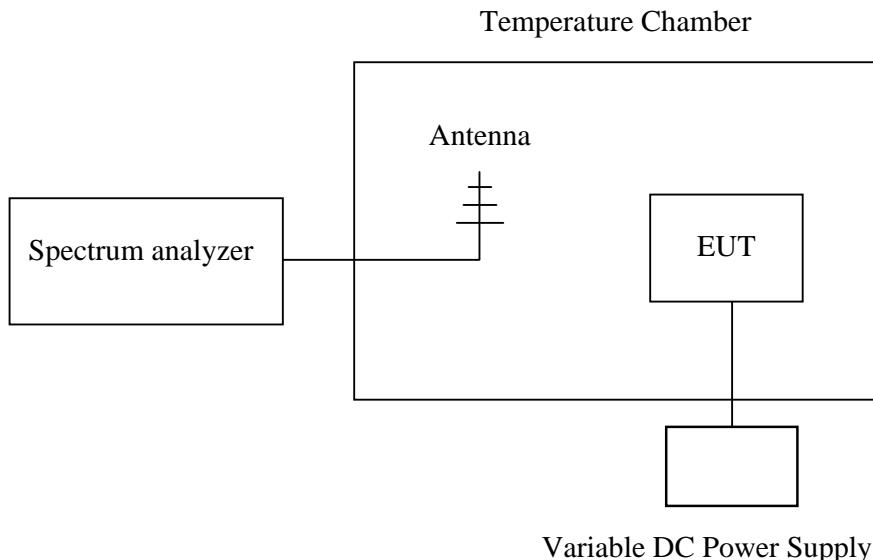
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7 Frequency Tolerance

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= 10kHz, Span =100kHz.
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)
Vdc	Temperature (°C)	(MHz)		
3.7	-20	13.559616	-109.00	+/- 1.356
3.7	-10	13.559533	-26.00	+/- 1.356
3.7	0	13.559499	8.00	+/- 1.356
3.7	10	13.559516	-9.00	+/- 1.356
3.7	20	13.559507	0.00	+/- 1.356
3.7	30	13.559591	-84.00	+/- 1.356
3.7	40	13.559549	-42.00	+/- 1.356
3.7	50	13.559491	16.00	+/- 1.356

B. Supply Voltage Variation

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
Vdc	Temperature (°C)	(MHz)		
4.255	20	13.559499	8.00	+/- 1.356
3.7	20	13.559507	0.00	+/- 1.356
3.145	20	13.559524	-17.00	+/- 1.356

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