

Report No.: ER/2012/10007 **Issue Date: Feb 06, 2012**

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ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: 2.4GHz Wireless mouse

Brand Name: ELECOM

Model No.: M-IR05DR

Model Difference: N/A

FCC ID: YWOM-IR05DR

ER/2012/10007 **Report No.:**

Issue Date: Feb. 06, 2012

FCC Rule Part: §15.249

Prepared for: ELECOM CO., LTD.

1-1 FUSHIMI-MACHI 4-CHOME, CHUO-KU,

OSAKA-SHI, OSAKA, JAPAN

SGS Taiwan Ltd. Prepared by:

Electronics & Communication Laboratory

No. 134, Wu Kung Rd., Wuku Industrial Zone,

Taipei County, Taiwan.



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VERIFICATION OF COMPLIANCE

Applicant: ELECOM CO., LTD.

1-1 FUSHIMI-MACHI 4-CHOME, CHUO-KU, OSAKA-SHI,

OSAKA, JAPAN

Product Description: 2.4GHz Wireless mouse

Brand Name: ELECOM

Model No.: M-IR05DR

FCC ID: YWOM-IR05DR

Model Difference: N/A

File Number: ER/2012/10007

Date of test: Jan. 10, 2012 ~ Feb. 04, 2012

Date of EUT Received: Jan. 10, 2012

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 15.249.

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

Test By:	Lazz Huang	Date:	Feb. 06, 2012	
Prepared By:	Judy Hang/Engineer Judy Han	Date:	Feb. 06, 2012	
Approved By:	Judy Hsu / Clerk Jim Ch ang Jim Chang / Supervisor	Date:	Feb. 06, 2012	

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Version

Version No.	Date	Description
00	Feb. 06, 2012	Initial creation of document

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GENERAL INFORMATION

1.1 Product Description

Product Name:	2.4GHz Wireless mouse			
Brand Name:	ELECOM			
Model No.:	M-IR05DR			
Model Difference:	N/A			
Hardware Version	Ver00			
Software Version	Version 105			
Operation Frequency:	2408~2474MHz			
Channel number:	34 channels			
Signal frequency:	2408MHz 2410 MHz 2412 MHz 2414 MHz 2416 MHz 2418 MHz 2420 MHz 2422 MHz 2424 MHz 2426 MHz 2428 MHz 2430 MHz 2432 MHz 2434 MHz 2436 MHz 2438 MHz 2440 MHz 2442 MHz 2444 MHz 2446 MHz 2448 MHz 2450 MHz 2452 MHz 2454 MHz 2456 MHz 2458 MHz 2460 MHz 2462 MHz 2464 MHz 2466 MHz 2468 MHz 2470 MHz 2472 MHz 2474 MHz			
Modulation Type:	GFSK			
Power Supply	DC 3V from AAA battery *2			
Antenna Designation:	PCB Antenna 4.45 dBi max.			

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1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: YWOM-IR05DR filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.

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 is: 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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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 engineering 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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Limitation

(1) Conducted Emission

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

Frequency	Conducted Limit (dBuV)			
(MHz)	Quasi-Peak	Average		
0.15 - 0.5	66 - 56	56 - 46		
0.5 - 5	56	46		
5 - 30	60	50		

(2) Radiated Emission 15.249(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

Frequency	Field strength of	Field strength of	Distance (m)
(MHz)	Fundamental	Harmonics	
902 - 928	50 mV/m	500 uV/m	3
	(94dBuV/m)	(54dBuV/m)	
2400 – 2483.5	50 mV/m	500 uV/m	3
	(94dBuV/m)	(54dBuV/m)	
5725 – 5875	50 mV/m	500 uV/m	3
	(94dBuV/m)	(54dBuV/m)	
24.0 – 24.25 GHz	250 mV/m	2500 uV/m	3
	(107.95dBuV/m)	(67.95dBuV/m)	

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(3) Radiated Emission15.249 (d)

Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209 as below, whichever is the lesser attenuation.

Frequency	Field strength	Distance (m)	Field strength at 3m
(MHz)	μV/m		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

(4) Radiated Emission 15.249(e)

For frequencies above 1000MHz, the above field strength limits are based on average limits. The peak filed strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

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.

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2.5 **Configuration of Tested System**

Fig. 2-1 Configuration

EUT

Table 2-2 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	N/A					

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

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3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	Conducted Emission	N/A
§15.249(a)(e)	Radiated Emission	Compliant
§15.249(d)	20dB band width Measurement	Compliant

Description of test modes

The EUT has been tested under operating condition. The EUT is staying in continuous transmitting mode.

Channel low (2408MHz) · mid (2440MHz) and high (2474MHz) with highest data rate are chosen for full testing.

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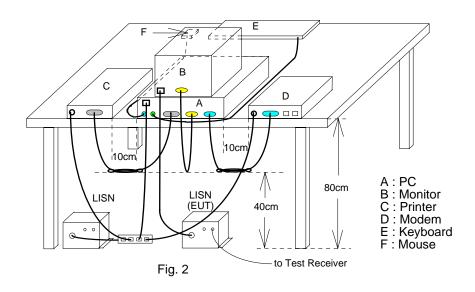
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5. Conducted Emissions Test

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	MFR	MODEL	SERIAL	LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
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	11/28/2011	11/27/2012	

5.4 Measurement Result:

N/A. 3V from Battery.

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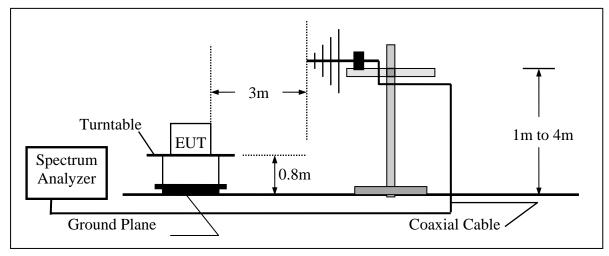
Radiated Emission Test

6.1 **Measurement Procedure**

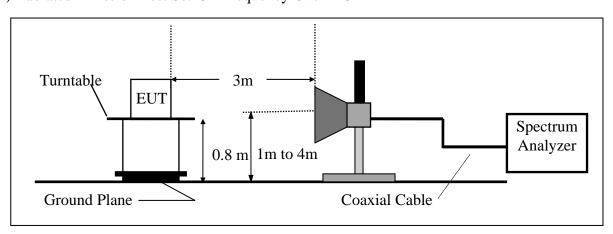
- The EUT was placed on a turntable that is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- And also, each emission was to be maximized by changing the polarization of receiving 3. antenna both horizontal and vertical.
- Repeat above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

Test SET-UP (Block Diagram of Configuration)

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



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



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Measurement Equipment Used:

966 Chamber						
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.		
Spectrum Analyzer	R&S	FSP 40	100034	03/30/2011	03/29/2012	
Bilog Antenna	SCHWAZBECK	VULB9160	3136	11/19/2011	11/18/2012	
Horn antenna	SCHWAZBECK	BBHA 9120D	309/320	01/22/2010	01/21/2012	
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2011	11/27/2012	
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2012	01/04/2013	
Radio Communication Analyzer	R & S	CMU200	111787	10/31/2010	10/30/2012	
DC Block	Agilent	BLK-18	155452	01/05/2012	01/04/2013	
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	01/05/2012	01/04/2013	
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2012	01/04/2013	
3m Site	SGS	966 chamber	N/A	09/06/2011	09/05/2012	

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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Measurement Result

Operation Band :2.4G Test Date :2012-01-11

Fundamental Frequency Temp./Humi. :27 deg C / 66 RH :2408MHz

:TX LOW Operation Mode Engineer :Lion

EUT Pol. :E2 :VERTICAL Measurement Antenna Pol.

Actual FS($dB\mu V/m$) = SPA. Reading level($dB\mu V$) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
99.84	S	Peak	31.39	-16.37	15.02	43.50	-28.48
159.98	S	Peak	26.64	-11.57	15.07	43.50	-28.43
288.99	S	Peak	27.23	-12.06	15.17	46.00	-30.83
361.74	S	Peak	28.87	-10.73	18.14	46.00	-27.86
543.13	S	Peak	28.28	-7.97	20.31	46.00	-25.69
872.93	S	Peak	28.68	-2.55	26.13	46.00	-19.87
2408.56	F	Average	84.05	5.21	89.26	94.00	-4.74
2408.56	F	Peak	86.62	5.21	91.83	114.00	-22.17
4816.00	Н	Average	40.63	10.00	50.63	54.00	-3.37
4816.00	Н	Peak	49.01	10.00	59.01	74.00	-14.99
7224.00	Н						
9632.00	Н						
12040.00	Н						
14448.00	Н						
16856.00	Н						
19264.00	Н						
21672.00	Н						
24080.00	Н						

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Test Date Operation Band :2.4G :2012-01-11

Fundamental Frequency :2408MHz Temp./Humi. :27 deg_C / 66 RH

Operation Mode :TX LOW Engineer :Lion

EUT Pol. :E2 :HORIZONTAL Measurement Antenna Pol.

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
50.37	S	Peak	26.59	-13.78	12.81	40.00	-27.19
157.07	S	Peak	26.96	-11.63	15.33	43.50	-28.17
288.02	S	Peak	36.75	-12.07	24.68	46.00	-21.32
372.41	S	Peak	39.70	-10.57	29.13	46.00	-16.87
468.44	S	Peak	30.79	-9.17	21.62	46.00	-24.38
875.84	S	Peak	28.83	-2.53	26.30	46.00	-19.70
2407.50	F	Average	84.05	5.90	89.95	94.00	-4.05
2407.50	F	Peak	87.44	5.90	93.34	114.00	-20.66
4816.00	Н	Average	42.64	10.02	52.66	54.00	-1.34
4816.00	Н	Peak	51.20	10.02	61.22	74.00	-12.78
7224.00	Н						
9632.00	Н						
12040.00	Н						
14448.00	Н						
16856.00	Н						
19264.00	Н						
21672.00	Н						
24080.00	Н						

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Operation Band :2.4G Test Date :2012-01-11

Fundamental Frequency :2440MHz Temp./Humi. :27 deg_C / 66 RH

Operation Mode :TX MID Engineer :Lion

EUT Pol. :E2 Measurement Antenna Pol. :VERTICAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
55.22	S	Peak	27.85	-14.17	13.68	40.00	-26.32
156.10	S	Peak	26.74	-11.64	15.10	43.50	-28.40
290.93	S	Peak	27.27	-12.05	15.22	46.00	-30.78
374.35	S	Peak	29.20	-10.55	18.65	46.00	-27.35
515.97	S	Peak	28.58	-8.52	20.06	46.00	-25.94
888.45	S	Peak	28.17	-2.28	25.89	46.00	-20.11
2439.56	F	Average	85.16	5.42	90.58	94.00	-3.42
2439.56	F	Peak	87.97	5.42	93.39	114.00	-20.61
4880.00	Н	Average	39.79	10.29	50.08	54.00	-3.92
4880.00	Н	Peak	48.32	10.29	58.61	74.00	-15.39
7320.00	Н						
9760.00	Н						
12200.00	Н						
14640.00	Н						
17080.00	Н						
19520.00	Н						
21960.00	Н						
24400.00	Н						

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Operation Band :2.4G Test Date :2012-01-11

Fundamental Frequency :2440MHz Temp./Humi. :27 deg_C / 66 RH

Operation Mode :TX MID Engineer :Lion

EUT Pol. :E2 Measurement Antenna Pol. :HORIZONTAL

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)

Note: "F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
49.40	S	Peak	26.90	-13.95	12.95	40.00	-27.05
159.01	S	Peak	26.74	-11.67	15.07	43.50	-28.43
288.02	S	Peak	33.98	-12.07	21.91	46.00	-24.09
373.38	S	Peak	38.20	-10.56	27.64	46.00	-18.36
468.44	S	Peak	31.03	-9.17	21.86	46.00	-24.14
900.09	S	Peak	27.57	-2.08	25.49	46.00	-20.51
2439.51	F	Average	84.35	6.25	90.60	94.00	-3.40
2439.51	F	Peak	88.34	6.25	94.59	114.00	-19.41
4880.00	Н	Average	40.20	10.24	50.44	54.00	-3.56
4880.00	Н	Peak	50.48	10.24	60.72	74.00	-13.28
7320.00	Н						
9760.00	Н						
12200.00	Н						
14640.00	Н						
17080.00	Н						
19520.00	Н						
21960.00	Н						
24400.00	Н						

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Test Date Operation Band :2.4G :2012-01-11

Fundamental Frequency :2474MHz Temp./Humi. :27 deg_C / 66 RH

Operation Mode :TX HIGH Engineer :Lion

EUT Pol. :E2 :VERTICAL Measurement Antenna Pol.

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
99.84	S	Peak	31.09	-16.37	14.72	43.50	-28.78
160.95	S	Peak	26.86	-11.59	15.27	43.50	-28.23
288.02	S	Peak	27.91	-12.07	15.84	46.00	-30.16
367.56	S	Peak	28.91	-10.62	18.29	46.00	-27.71
547.01	S	Peak	27.85	-7.90	19.95	46.00	-26.05
854.50	S	Peak	28.19	-2.82	25.37	46.00	-20.63
2474.51	F	Average	84.41	5.73	90.14	94.00	-3.86
2474.51	F	Peak	87.00	5.73	92.73	114.00	-21.27
4948.00	Н	Average	41.95	10.73	52.68	54.00	-1.32
4948.00	Н	Peak	51.57	10.73	62.30	74.00	-11.70
7422.00	Н						
9896.00	Н						
12370.00	Н						
14844.00	Н						
17318.00	Н						
19792.00	Н						
22266.00	Н						
24740.00	Н						

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Test Date Operation Band :2.4G :2012-01-11

Fundamental Frequency :2474MHz Temp./Humi. :27 deg_C / 66 RH

Operation Mode :TX HIGH Engineer :Lion

EUT Pol. :E2 :HORIZONTAL Measurement Antenna Pol.

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency. Note:

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

"---": denotes Noise Floor.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
49.40	S	Peak	26.86	-13.95	12.91	40.00	-27.09
158.04	S	Peak	27.29	-11.77	15.52	43.50	-27.98
288.02	S	Peak	33.62	-12.07	21.55	46.00	-24.45
371.44	S	Peak	39.81	-10.60	29.21	46.00	-16.79
468.44	S	Peak	32.18	-9.17	23.01	46.00	-22.99
900.09	S	Peak	27.98	-2.08	25.90	46.00	-20.10
2473.44	F	Average	82.60	6.71	89.31	94.00	-4.69
2473.44	F	Peak	86.65	6.71	93.36	114.00	-20.64
4948.00	Н	Average	41.28	10.59	51.87	54.00	-2.13
4948.00	Н	Peak	50.59	10.59	61.18	74.00	-12.82
7422.00	Н						
9896.00	Н						
12370.00	Н						
14844.00	Н						
17318.00	Н						
19792.00	Н						
22266.00	Н						
24740.00	Н						

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20 dB Band Width Measurement

7.1 Measurement Procedure

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. Set ETU normal operating mode.
- 3. Set SPA Center Frequency = fundamental frequency, RBW = 100kHz, VBW = 300kHz, Span =1MHz.
- 4. Set SPA Max hold. Mark peak, -20dB.

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 4.2 Radiated Emission Measurement.

7.3 Measurement Equipment Used:

Same as 4.2 Radiated Emission Measurement.

7.4 Measurement Results:

2408 Channel = 2.933MHz

2440 Channel = 2.508MHz

2474 Channel = 2.967MHz

Refer to attached data chart.

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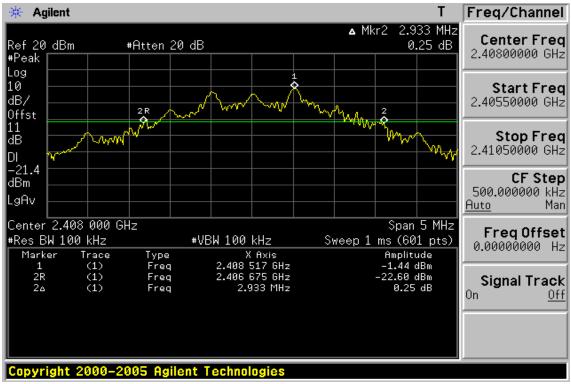
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20dB Bandwidth Test Data CH-Low



20dB Bandwidth Test Data CH-Mid



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20dB Bandwidth Test Data CH-High



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