Measurement Report

FCC ID:PQY-4710874200463

This report concerns (check one) : ■ **Original Grant** □ **Class II Change**

Issued Date	:	Dec. 17, 2003
Project No.	:	03E0606
Equipment	:	2.4GHz Digital Mini Mouse Presenter
Model No.	:	OPMP-2401; OPMP-2402; OPMP-2401B; OPMP-2402B
Applicant	:	CELLINK CO., LTD 11F, No. 102, Sec. 1, Hsin Tai Wu Rd., Hsi-Chih, Taipei, Taiwan, R.O.C.

Tested by :
Neutron Engineering Inc. EMC Laboratory
Data of Test :
Sep. 25, 2003 ~ Dec. 15, 2003

Testing Engineer : (Alan Liu)

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CNLA 0659 ILAC MRA

NVLAP Lab Code: 200145-0

Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**., or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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Assessment Authorities

NVLAP Lab Code: 200145-0

CNLA
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Test Standard/Scope/Item Acceptance

FCC Part 15 Subpart B
IEC/CISPR22
AS/NZS 3548
CNS 13438

FCC Part 15 Subpart B
CISPR 22/EN 55022
AS/NZS 3548
VCCI -Technical Requirement
CNS 13438
SS IEC/CISPR 22

IEC/EN 61000-3-2	IEC/EN 61000-4-5
IEC/EN 61000-3-3	IEC/EN 61000-4-6
IEC/EN 61000-4-2	IEC/EN 61000-4-8
IEC/EN 61000-4-3	IEC/EN 61000-4-11
IEC/EN 61000-4-4	

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1. General Information

1.1 Applicant

Name CELLINK CO., LTD

Address 11F, No. 102, Sec. 1, Hsin Tai Wu Rd., Hsi-Chih, Taipei, Taiwan, R.O.C.

1.2 Manufacturer

Name N/A

Address N/A

1.3 Equipment Under Tested

Name: 2.4GHz Digital Mini Mouse Presenter

Trade Name: Cellink

Model No.: OPMP-2401; OPMP-2402; OPMP-2401B; OPMP-2402B

1.4 OEM Brand/Model (if applicable)

OEM Brand(s)/Model(s) except the basic model in sub-clause 1.3 is(are) the follows:

OEM Brand: N/A

Model No.: N/A

1.5 Product Descriptions(Application/Features/Specification)

The EUT is a/an 2.4GHz Digital Mini Mouse Presenter. A major technical descriptions of EUT is described as following:

Operation Frequency	2402~2480 MHz
Modulation Type	GFSK
Bit Rate of Transmitter	800dpi
Channel Spacing	1MHz
Antenna Designation	Integral Antenna
Number Of Channel	79 Channel
Channel List	Please refer to the next page

Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	31	2432	61	2462
02	2403	32	2433	62	2463
03	2404	33	2434	63	2464
04	2405	34	2435	64	2465
05	2406	35	2436	65	2466
06	2407	36	2437	66	2467
07	2408	37	2438	67	2468
08	2409	38	2439	68	2469
09	2410	39	2440	69	2470
10	2411	40	2441	70	2471
11	2412	41	2442	71	2472
12	2413	42	2443	72	2473
13	2414	43	2444	73	2474
14	2415	44	2445	74	2475
15	2416	45	2446	75	2476
16	2417	46	2447	76	2477
17	2418	47	2448	77	2478
18	2419	48	2449	78	2479
19	2420	49	2450	79	2480
20	2421	50	2451		
21	2422	51	2452		
22	2423	52	2453		
23	2424	53	2454		
24	2425	54	2455		
25	2426	55	2456		
26	2427	56	2457		
27	2428	57	2458		
28	2429	58	2459		
29	2430	59	2460		
30	2431	60	2461		

1.6 Connecting I/O Port(s)

Please refer to the User's Manual.

1.7 Power Supplied

Power Source: Battery supplied (lithium type)

Power Cord: N/A

Power Rating: DC I/P 3Vdc, 0.019A

1.8 Products Covered (if applicable)

The sample tested including the following sub-system/module/accessory :

Sub-system/ Module/ Accessory	Model/Type No.	Int. Inst./ Ext. Cont.
N/A	N/A	N/A

1.9 Model Difference (Series, Versions, if any)

Except the basic model no. (model designation of the sample tested in this test report), additional model no. covered is(are) :

There are four models listed below:

Model	RF Mouse
OPMP-2401	TX1
OPMP-2401B	TX2
OPMP-2402	TX1
OPMP-2402B	TX2
NOTE: 1. TX- RF Mouse 2. TX1, TX2: based on similar electrical circuit except that TX1 has the laser module, TX2 not	

All the above models were tested, and the model: OPMP-2401 was found to be the worst case during the pr-scanning test. This model of the worst case was used for final testing and collecting test data included in this report.

1.10 EUT Modifications (if applicable)

No any modification required for the EUT to comply with the standards.

1.11 Photos of EUT

Please refer to the Attachment – **C.**

2. RFI Emissions Measurement

2.1Test Facility

The test facilities used to collect the test data in this report located at No.132-1, Lane 329, Sec. 2, Palain Road, Shijr City, Taipei, Taiwan.

2.2 Standard Compliance

The test data contained in this report relate only to the item(s) listed below :

FCC Part15, Subpart C (15.249) / ANCI C63.4 : 1992

2.3 Test Conditions and Channel

Test Mode	EUT Channel	Test Frequency(MHz)
1	CH 01	2402
2	CH 40	2441
3	CH 79	2480

Note:

(1)The measurements are performed at the highest, middle and lowest available channels with the modulation enabled.

2.4 Test Methodolog

Only radiated testing was performed during the max. EMI emission evaluation. Conducted testing excepted because of the EUT is a battery operating device and no any other cable connection to PC device.

Test procedures according to the technical standards : (Antenna to EUT distance is 3 m)

FCC Part15 (15.249) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.209	Radiated Emission	Class B	30-1000	PASS
15.249	Radiated Emission	Field strength of fundamental 50000 μV/m (94 dBμV/m) @ 3 m	2400-2483.5	PASS
		Field strength of harmonics 500 μV/m (54 dBμV/m) @ 3 m	Above 2483.5	PASS

2.5 Deviations from Standard Test Method

N/A

2.6 Sample(s) Tested

The representative sample tested in this reports is(are): OPMP-2401

Test results in this test report relate only to the sample(s) tested.

The EUT has been tested according to the following environmental condition:

Input Power	DC:3V
Temperature	23 ℃
Relative Humidity	67 %

2.7 Measurement Instruments

Valid measurement instruments used in this report refer to **Table-1** enclosed.

2.8 Measurement Uncertainty

The reported uncertainty of measurement **y ± U，** where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2，** providing a level of confidence of approximately **95** %。

A. Conducted Measurement :5.05dB

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U，(dB)	NOTE
OS-01	ANSI	30MHz ~ 200MHz	H	4.59	
		30MHz ~ 200MHz	V	4.80	
		200MHz ~ 1,000MHz	H	4.47	
		200MHz ~ 1,000MHz	V	5.03	

2.9 Tested System Set-Up/Configuration Details

The system was configured for testing in a typical fashion (as a user would normally use) or in-accordance with the operating configuration specified in the user's manual. A Block Diagram(please refer to the Diagram - 1) and Photos(please refer to the attachment - **B**) showing the set-up/configuration of system tested. In addition, **Table-2** and **Table-3** provide a detail of all equipment items and cables information used in the system tested.

Table -1 Measurement Instruments List

Item	Instruments	Mfr/Brand	Model/Type No.	Serial No.	Calibrated Date	Next Cali. Date	Note
1	Spectrum	HP	85662B	2648A13616	2003/10/20	2004/04/19	✓
2	Spectrum	HP	85680B	2634A03025	2003/10/20	2004/04/19	✓
3	Quasi-Peak	HP	85650A	2521A00844	2003/10/20	2004/04/19	✓
4	Pre-Selector	HP	85685A	2648A00417	2003/10/20	2004/04/19	✓
5	Test Receiver	R&S	ESAI	844348/008	2002/11/21	2003/11/20	
6	Test Receiver	R&S	ESMI	843977/005	2002/11/21	2003/11/20	
7	Pre-Amplifier	R&S	ESMI-Z7	1045.5020.9801 (612.278 014 00)	2003/05/19	2004/05/18	✓
8	Spectrum Analyzer	Advantest	R3261C	81720298	2003/08/13	2004/08/12	✓
9	Spectrum Analyzer	HP	8591EM	3536A00687	2003/04/25	2004/04/24	
10	LOGBICON Ant	MESS-ELEKTRONIK	VULB 9160	3058	2002/10/23	2003/10/22	
11	LOGBICON Ant	MESS-ELEKTRONIK	VULB 9160	3060	2003/10/21	2004/10/20	✓
12	LOGBICON Ant	MESS-ELEKTRONIK	VULB 9161	4022	2002/07/25	2003/07/24	
13	Short Dipole Ant.	Schwarzbeck	VHAA9110	147	2003/01/03	2004/01/02	
14	Precision Dipole Ant.	Schwarzbeck	VHAP/UHAP	986 987 969 970	2002/01/04	2004/01/03	
15	Horn Ant	EMCO	3115	9605-4803	2003/05/23	2004/05/22	✓
16	Horn Ant	Schwarzbeck	BBHA 9120 D	9120D-325	2003/10/14	2004/10/13	✓
17	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2002/10/21	2003/10/20	
18	LISN	EMCO	Feb-25	9605-2539	2003/06/10	2004/06/09	✓
19	LISN	Rolf Heine	NNB-2/16Z	98083	2003/10/31	2004/10/30	✓
20	LISN	Rolf Heine	NNB-2/16Z	98053	2002/11/15	2003/11/14	
21	Sound Level Meter	QUEST	210	DCA100012	2002/08/28	2003/08/27	
22	EMI Receiver	MEB	SMV4.1	130	2002/12/06	2003/12/05	
23	RF Switch	Anritsu	MP59B	M65982	2001/12/09	2003/12/08	
24	Pulse Limiter	Electro-Metrics	EM-7600	112644	2002/12/09	2003/12/08	
25	ATTENUATOR (11dB)	HP	8494B	3308A38680	2003/05/08	2004/05/07	
26	ATTENUATOR (70dB)	HP	8495B	3308A20487	2003/05/08	2004/05/07	
27	50ÙTerminator	N/A	N/A	N/A	2003/05/09	2004/05/08	✓
28	Pre-Amplifier	Anritsu	MH648A	M09961	2003/12/08	2004/12/07	✓
29	Microwave Pre_amplifier	Agilent	8449B	3008A01714	2003/03/10	2004/03/09	
30	LISN For Car Testing	Rolf Heine	LN-KFZ-200	02/10000	2003/01/27	2004/01/26	
31	Signal Generator	HP	8648A	3426A01034	2002/10/11	2004/10/08	
32	Signal Generator	R&S	SMT06	832080/007	2003/04/07	2004/04/06	✓
33	AUDIO Generator	GW	GAG-810	7650777	2002/12/09	2003/12/08	
34	Test Cable	N/A	10M_OS02	N/A	2003/12/09	2004/12/08	✓
35	Test Cable	N/A	OS02-1/-2/-3	N/A	2003/12/09	2004/12/08	✓
36	Test Cable	N/A	C01	N/A	2003/12/09	2004/12/08	✓
37	Microflex Cable	United Microwave	57793	1m	2003/04/07	2004/04/06	✓
38	Microflex Cable	United Microwave	57793	3m	2003/04/07	2004/04/06	
39	Microflex Cable	United Microwave	A30A30-5006	4M	2003/04/07	2004/04/06	✓
40	Microflex Cable	United Microwave	A30A30-5006	10M	2003/04/07	2004/04/06	
41	Antenna Mast	Chance Most	CMTB-1.5	N/A	N/A	N/A	✓
42	Turn Table	Chance Most	CMTB-1.5	N/A	N/A	N/A	✓

Remark :
(1)" ✓" indicates the instrument used in Test Report.
(2)" N/A" denotes No Model No. / Serial No. and No Calibration specified.

Diagram - 1
Block diagram showing the configuration of system tested

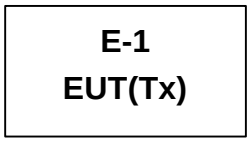


Table - 2 Equipments Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	2.4GHz Digital Mini Mouse Presenter	Cellink	OPMP-2401	PQY-4710874200463		EUT

Note:

(1) Unless otherwise denoted as EUT in 『Remark』 column , device(s) used in tested system is a support equipment.
(2) Unless otherwise marked as ※ in 『Remark』 column, Neutron consigns the support equipment to the tested system.
(3) The support equipment was authorized by Declaration of Confirmation.

Table - 3 Information of Interface Cable

Item	Shielded Type	Ferrite Core	Length	Note
	N/A	N/A	N/A	

Note:

(1) Unless otherwise marked as ※ in 『Remark』 column, Neutron consigns the support equipment to the tested system.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.10 Max.(Worst Case) RF Emission Evaluation

(a) Only radiated testing was performed during the max. EMI emission evaluation. Conducted testing excepted because of the EUT is a battery operating device and no any other cable connection to PC device.
(b) The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit & receive during test. This operating condition was tested and used to collect the included data.
(c) To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of this EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.
These operation modes were used for final testing and collecting test data included in this report.

2.11 EUT Operation

The EUT exercise program used during radiated and emission measurement was designed to exercise the various system components in a manner similar to a typical use.
The measurements are performed at the highest, middle and lowest available channels with the modulation enabled.

3. Justification

3.1 Limitations

3.1.1 Power Line Conducted Emission

Measurement Frequency Range (MHz)	Mains Terminal Class A Limits (dBuV)		Mains Terminals Class B Limits (dBuV)		Note CISPR FCC Std.
	QP Mode	AV Mode	QP Mode	AV Mode	
0.15 - 0.50	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 - 5.00	73.00	60.00	56.00	46.00	CISPR
5.00 - 30.0	73.00	60.00	60.00	50.00	CISPR
0.45-1.705	60.00	N/A	48.00	N/A	FCC
1.705-30.0	69.50	N/A	48.00	N/A	FCC

Notes:

(1). The tighter limit applies at the band edges.

(2). The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

3.1.2 Radiated Emission Limits (Frequency Range 30MHz-1000MHz)

Measurement Frequency Range (MHz)	Quasi-Peak Mode Class A Limits (dBuV/m)		Quasi-Peak Mode Class B Limits (dBuV/m)		Note CISPR FCC Std.
	10m	30m	10m	3m	
30.00 -230.00	40.00	30.00	30.00	40.00	CISPR
230.0 -1000.0	47.00	37.00	37.00	47.00	CISPR
30.00 - 88.00	39.00	N/A	30.00	40.00	FCC
88.00 - 216.0	43.50	N/A	33.50	43.50	FCC
216.0 -960.0	46.00	N/A	36.00	46.00	FCC
above 960.0	49.50	N/A	46.00	54.00	FCC

Notes:

(1). The tighter limit applies at the band edges.

(2). Emission level (dBuV/m)=20log Emission level (uV/m).

(3). A measuring distance 0f 10m is a primary used. However, either 3m or 10m (instead of 10m) distance my be allowed. If the distance is 3m, add 10dB to the QP-limit above. If the distance is 10m, subtract 10dB from the QP-limit above.

3.2 Measurement Justification

3.2.1 Conducted Emission

The EUT is a placed on as table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-1992. Conducted emissions from the EUT measured in the **frequency range between 0.15 MHz and 30MHz** were made with a **Spectrum Analyzer** using **CISPR Quasi-Peak detector mode**.

The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and these signals are then Quasi Peak detector mode and/or Average detector mode re-measured.

Data of **Table - 4**. lists the significant emission frequencies, measured levels, limits and safe margins. All readings are Peak Mode measured unless otherwise stated as QP or AV in column of " Remark ".

If the Peak Mode measured value lower than both QP Mode and AV Mode Limit, EUT shall be deemed to compliance with both QP & AV Limits and then no additional QP Mode or AV Mode measurement performed.

If additional QP or AV Mode measurement needed, and if the QP Mode measured value compliance with the QP Mode Limit and lower than AV Mode Limit, the EUT shall be deemed to meet both QP & AV Limits and then only QP Mode was measured, but AV Mode was not performed。

3.2.2 Radiated Emission

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 13.1.4.1 of ANSI C63.4-1992.

The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak, Peak or Average detector mode re-measured.

Data of **Table – 5** lists the significant emission frequencies, measured levels, limits and safe margins. All readings are Peak Mode measured unless otherwise stated as QP or AV in column of " Remark ".

If the Peak Mode measured value compliance with and lower than Quasi Peak or Average Mode Limit, the EUT shall be deemed to meet QP/AV Limits and then no additional QP/AV Mode measurement performed.

3.2.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as **FS = RA + AF + CL - AG**

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor (1)
CL = Cable Attenuation Factor(Cable Loss) (1)
AG = Amplifier Gain (1)

Remark :

(1) The Correction Factor = AF + CL - AG, as shown in the data tables' Correction Factor column.

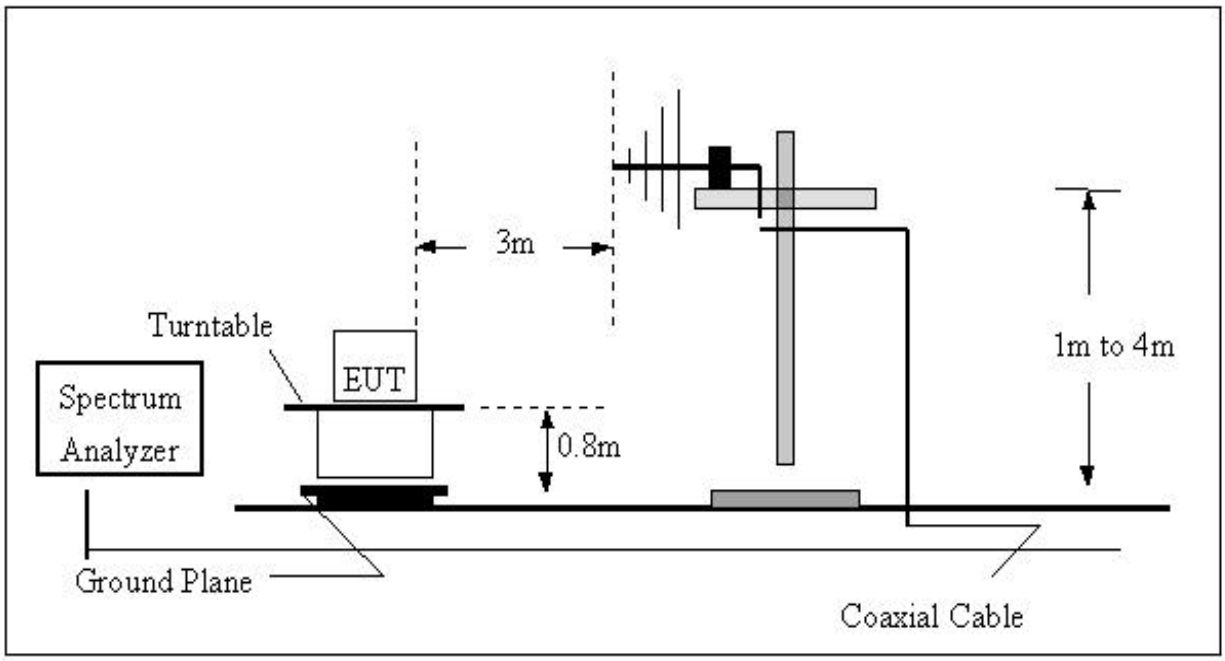
3.3 Measurement Data

Table - 4. Conducted Emission Data (015-30MHz) – Not Applicable

Table - 5. Radiated Emission Data (30-1000MHz)

Radiated Emission Data (above 1000MHz)

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



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

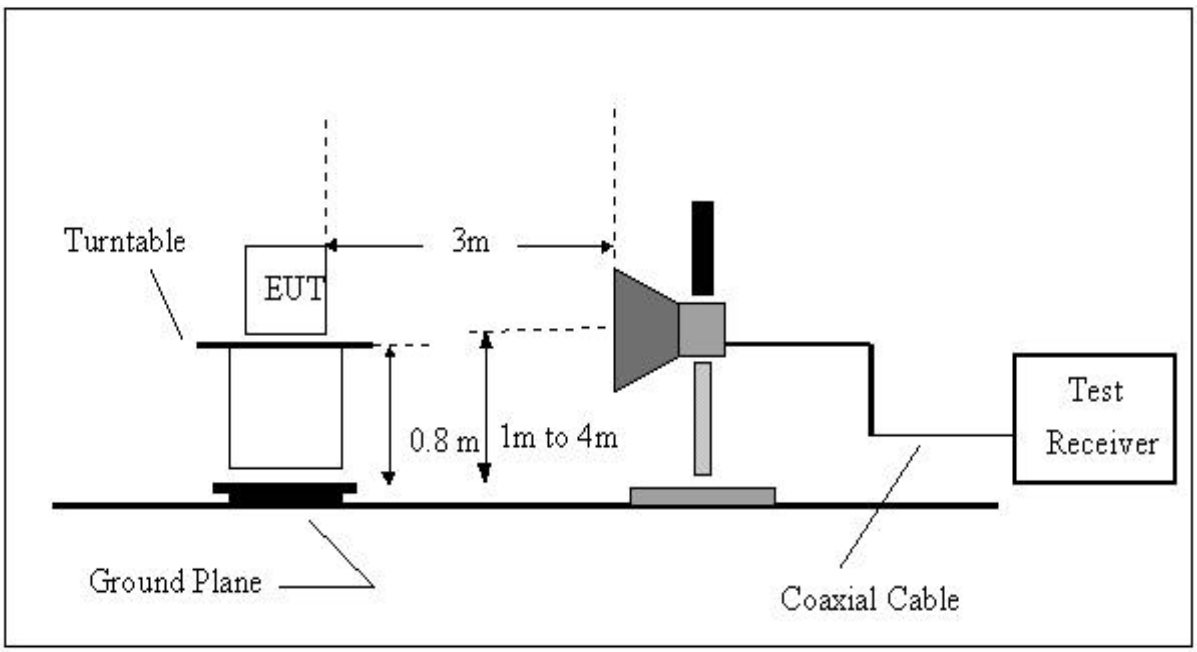


Table 5 Radiated Emission Data (2400-2483.5MHz)

Special Notes：(EUT Operation Mode or Test Configuration Mode, if applicable)
CH01/CH40/CH79

Freq. (MHz)	Ant.Pol. (H/V)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL/ CF(dB)	Peak Actual FS (dBuV/m)	AV Actual FS (dBuV/m)	Peak Limit3m (dBuV/m)	AV Limit3m (dBuV/m)	NOTE
2402.0	H	88.80	-	-15.84	72.96	-	114.00	94.00	CH01
2402.0	V	96.06	-	-15.84	80.22	-	114.00	94.00	CH01
2441.0	H	83.11	-	-15.90	67.21	-	114.00	94.00	CH40
2441.0	V	91.82	-	-15.90	75.92	-	114.00	94.00	CH40
2480.0	H	93.24	-	-15.96	77.28	-	114.00	94.00	CH79
2480.0	V	95.60	-	-15.96	79.64	-	114.00	94.00	CH79

Remark：

(1) Spectrum Setting : 30MHz – 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.
1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms

(2) 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.

Table 5 Radiated Emission Data (30-1000MHz)

Special Notes：(EUT Operation Mode or Test Configuration Mode, if applicable)

The following table lists worst case data from TX with various bitrates on various channels.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)	Note
36.100	V	Peak	28.40	-12.31	16.09	40.00	-23.91	
65.700	V	Peak	30.40	-13.70	16.70	40.00	-23.30	
108.000	V	Peak	34.17	-13.11	21.06	43.50	-22.44	
174.000	V	Peak	26.70	-11.46	15.24	43.50	-28.26	
325.700	V	Peak	30.45	-9.51	20.94	46.00	-25.06	
403.400	V	Peak	29.57	-7.91	21.66	46.00	-24.34	
488.000	V	Peak	34.70	-6.11	28.59	46.00	-17.41	
566.900	V	Peak	30.52	-4.33	26.19	46.00	-19.81	
33.900	H	Peak	29.60	-12.46	17.14	40.00	-22.86	
64.200	H	Peak	32.30	-13.41	18.89	40.00	-21.11	
107.700	H	Peak	35.70	-13.13	22.57	43.50	-20.93	
193.700	H	Peak	28.17	-13.09	15.08	43.50	-28.42	
278.900	H	Peak	37.52	-10.89	26.63	46.00	-19.37	
382.900	H	Peak	29.10	-8.61	20.49	46.00	-25.51	
420.600	H	Peak	29.55	-7.50	22.05	46.00	-23.95	
486.900	H	Peak	33.70	-6.14	27.56	46.00	-18.44	

Remark：

(1) Spectrum Setting : 30MHz – 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms

(2) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(3) Measuring frequency range from 25MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; " H" denotes spurious frequency. "E" denotes band edge frequency.

(4) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission 。

(5) 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.

Table 5 Radiated Emission Data (above 1000MHz)

Special Notes：(EUT Operation Mode or Test Configuration Mode, if applicable)
The following table lists worst case data from TX / RX with various orthogonal planes on the EUT antenna.

CH1(2402MHz)

Freq. (MHz)	Ant.Pol. (H/V)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CF CF(dB)	Peak Act. (dBuV/m)	AV Act. (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	NOTE
2399.9	V	86.41	61.30	-15.84	70.57	45.46	74.00	54.00	X/E
4804.0	V	71.64	50.18	-11.72	59.92	38.46	74.00	54.00	X/H
7205.0	V	63.06	50.08	-6.71	56.35	43.37	74.00	54.00	X/H
9605.0	V	58.77	46.62	-5.32	53.45	41.30	74.00	54.00	X/H
12005.0	V	53.76	-	-4.54	49.22	-	74.00	54.00	X/H
14410.0	V	47.21	-	-2.08	45.13	-	74.00	54.00	X/H
16878.0	V	47.01	-	-3.67	43.34	-	74.00	54.00	X/H
2399.9	H	87.64	62.51	-15.84	71.80	46.67	74.00	54.00	X/E
4804.0	H	70.22	57.72	-11.72	58.50	46.00	74.00	54.00	X/H
7205.0	H	58.82	49.33	-6.71	52.11	42.62	74.00	54.00	X/H
9605.0	H	55.26	-	-5.32	49.94	-	74.00	54.00	X/H
12005.0	H	50.74	-	-4.54	46.20	-	74.00	54.00	X/H
14410.0	H	44.34	-	-2.08	42.26	-	74.00	54.00	X/H
16821.0	H	46.50	-	-3.89	42.61	-	74.00	54.00	X/H

Remark：

(1) Spectrum Setting : 30MHz – 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。
(3) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; " H" denotes spurious frequency. "E" denotes band edge frequency.
(4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。
(5) 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.
(6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
(7) EUT Orthogonal Axes：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

Table 5 Radiated Emission Data (above 1000MHz)

Special Notes：(EUT Operation Mode or Test Configuration Mode, if applicable)

The following table lists worst case data from TX / RX with various orthogonal planes on the EUT antenna.

CH40(2441MHz)

Freq. (MHz)	Ant.Pol. (H/V)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CF CF(dB)	Peak Act. (dBuV/m)	AV Act. (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	NOTE
4884.0	V	73.09	55.14	-11.7	61.39	43.44	74.00	54.00	X/H
7330.0	V	59.50	47.51	-6.53	52.97	40.98	74.00	54.00	X/H
9765.0	V	53.84	-	-5.14	48.70	-	74.00	54.00	X/H
12205.0	V	51.20	-	-4.59	46.61	-	74.00	54.00	X/H
14650.0	V	46.53	-	-2.85	43.68	-	74.00	54.00	X/H
17133.0	V	46.07	-	-2.81	43.26	-	74.00	54.00	X/H
4884.0	H	72.43	57.39	-11.7	60.73	45.69	74.00	54.00	X/H
7330.0	H	56.84	-	-6.53	50.31	-	74.00	54.00	X/H
9765.0	H	54.04	-	-5.14	48.90	-	74.00	54.00	X/H
12205.0	H	48.15	-	-4.59	43.56	-	74.00	54.00	X/H
14650.0	H	46.81	-	-2.85	43.96	-	74.00	54.00	X/H
17091.0	H	46.32	-	-2.82	43.50	-	74.00	54.00	X/H

Remark：

(1) Spectrum Setting : 30MHz – 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms

(2) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。

(3) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; " H" denotes spurious frequency. "E" denotes band edge frequency.

(4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。

(5) 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.

(6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(7) EUT Orthogonal Axes：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

Table 5 Radiated Emission Data (above 1000MHz)

Special Notes：(EUT Operation Mode or Test Configuration Mode, if applicable)
The following table lists worst case data from TX / RX with various orthogonal planes on the EUT antenna.

CH79(2480MHz)

Freq. (MHz)	Ant.Pol. (H/V)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CF CF(dB)	Peak Act. (dBuV/m)	AV Act. (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	NOTE
2484.0	V	71.81	42.56	-15.96	55.85	26.60	74.00	54.00	X/E
2498.7	V	70.08	32.86	-15.99	54.09	16.87	74.00	54.00	X
4960.0	V	72.43	58.20	-11.49	60.94	46.71	74.00	54.00	X/H
7440.0	V	60.54	48.73	-6.53	54.01	42.20	74.00	54.00	X/H
9924.0	V	56.56	-	-5.15	51.41	-	74.00	54.00	X/H
12402.0	V	50.67	-	-4.60	46.07	-	74.00	54.00	X/H
14880.0	V	48.05	-	-3.65	44.40	-	74.00	54.00	X/H
2483.5	H	68.56	-	-15.96	52.60	-	74.00	54.00	X/E
4960.0	H	68.77	55.75	-11.49	57.28	44.26	74.00	54.00	X/H
7440.0	H	57.65	-	-6.53	51.12	-	74.00	54.00	X/H
9924.0	H	53.05	-	-5.15	47.90	-	74.00	54.00	X/H
12402.0	H	52.54	-	-4.60	47.94	-	74.00	54.00	X/H
14880.0	H	46.81	-	-3.65	43.16	-	74.00	54.00	X/H
17358.0	H	50.01	-	-1.96	48.05	-	74.00	54.00	X/H

Remark：

(1) Spectrum Setting : 30MHz – 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.
1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms
(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform。
(3) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency。"F" denotes fundamental frequency; " H" denotes spurious frequency. "E" denotes band edge frequency.
(4) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。
(5) 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.
(6) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
(7) EUT Orthogonal Axes：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

Table 5 Radiated Emission Data (Restricted Bands Requirements)

Special Notes：(EUT Operation Mode or Test Configuration Mode, if applicable)

The emission of the carrier radiated field strength is measured for channel 0 and channel 78 (Peak and AV) as following:

1. The transmitter was configured with the worst case antenna and setup to transmit at the highest channel (CH 78). Then the field strength was measured at 2483.5-2500 MHz.
2. The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel (CH 00). Then the field strength was measured at 2310-2390 MHz.

Please refer to the attachment L about the Restricted Bands emission plot.

Freq.	Ant.Pol.	Peak Reading	AV Reading	Ant./CF	Peak Act.	AV Act.	Peak Limit	AV Limit	
(MHz)	(H/V)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	NOTE
2388.0	V	59.62	-	-15.81	43.81	-	74.00	54.00	
2498.0	V	70.08	32.86	-15.99	54.09	16.87	74.00	54.00	
2388.0	H	58.58	-	-15.81	42.77	-	74.00	54.00	
2498.0	H	62.90	-	-15.99	46.91	-	74.00	54.00	

Remark：

(1) Spectrum Setting : 30MHz – 1000MHz , RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms. 1GHz- 25GHz, RBW= 1MHz, VBW= 1MHz, Sweep time = 200 ms

(2) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission 。

(3) EUT Orthogonal Axes：

"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

Attachment

Table Contents

Attachment - A.

EUT Modification Description

Attachment - B.

EUT Test Photos

Attachment - C.

EUT Photos

1. Photo # 1 Front View/ Rear View
2. Photo # 2~3 Unit Partially Disassembled
3. Photo # 4 Front View/ Rear View
4. Photo # 5~6 Unit Partially Disassembled

Attachment – D

Bandwidth Requirement

Attachment - E

Product Labeling