

**DIGITAL EMC CO., LTD.**

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<http://www.digitalemccom>**CERTIFICATION OF COMPLIANCE****SAMSUNG ELECTRO-MECHANICS CO., LTD**

314, Maetan3-Dong YoungTong-Gu, Suwon,

Gyunggido, Korea 442-734

Dates of Tests: October 23 ~November 16, 2007

Test Report S/N: DR50110711I

Test Site : DIGITAL EMC CO., LTD.

FCC ID

E2XSM30-R

APPLICANT

SAMSUNG ELECTRO-MECHANICS CO., LTD.

FCC Classification	:	Part 15 Low Power Communication Device Transmitter
Device name	:	Wireless Mouse USB Dongle
Manufacturer	:	Dongguan Komi Electronics CO., LTD
FCC ID	:	E2XSM30-R
Model name	:	SM30-R
Test Device Serial number	:	Identical prototype
FCC Rule Part(s)	:	FCC Part 15.249; ANSI C-63.4-2003
Frequency Range	:	2402.8 ~ 2478.0 MHz
Data of issue	:	November 16, 2007

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



NVLAP LAB CODE 200559-0

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1. General information

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

Address : 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".
This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200559-0.

Test operator: engineer

November 16, 2007

Won-Jung LEE



Data

Name

Signature

Report Reviewed By: manager

November 16, 2007

Harvey Sung



Data

Name

Signature

Ordering party:

Company name : SAMSUNG ELECTRO-MECHANICS CO.,LTD
Address : 314, Maetan3-Dong YoungTong-Gu, Suwon,
Zip code : 442-734
City/town : Gyunggido
Country : KOREA
Date of order : September 13, 2007

2. Information about test item

E2XSM30-R

2.1 Equipment information

Equipment model name	SM30-R
Type of equipment	2.4GHz Wireless Mouse USB Dongle
Frequency band	2402.8MHz ~ 2478.0MHz
Type of Modulation	GFSK
Channel Spacing	1.6MHz
Type of antenna	Pattern Antenna
Power Supply(Battery)	DC 5.0V

2.2 Tested frequency

Frequency	TX
Low frequency	2402.8MHz
Middle frequency	2439.6MHz
High frequency	2478.0MHz

2.3 Tested environment

Temperature	: 15 ~ 35 (°C)
Relative humidity content	: 20 ~ 75 %
Air pressure	: 86 ~ 103 kPa
Details of power supply	: DC 5.0V

2.4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
Laptop PC	PP02X	37552857229	DELL
Printer	SRP-770	SRP77008060035	SAMSUNG ELECTRONICS

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing -> none

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
I. Transmit mode(Tx)				
15.249 (a)	Field Strength Limits	Refer to the FCC 15.249(a)	Radiated	C
15.205 / 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	< FCC 15.209 limits	Radiated	C
15.207	AC Conducted Emissions	< FCC 15.207 limits	Line Conducted	C
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable				

The sample was tested according to the following specification:

FCC Parts 15.249; ANSI C-63.4-2003

3.2 Transmitter requirements

3.2.1 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT operates at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak detector mode and average detector mode with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: Complies

Minimum Standard: FCC Part 15.207(a)/EN 55022

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

* Decreases with the logarithm of the frequency

Measurement Setup

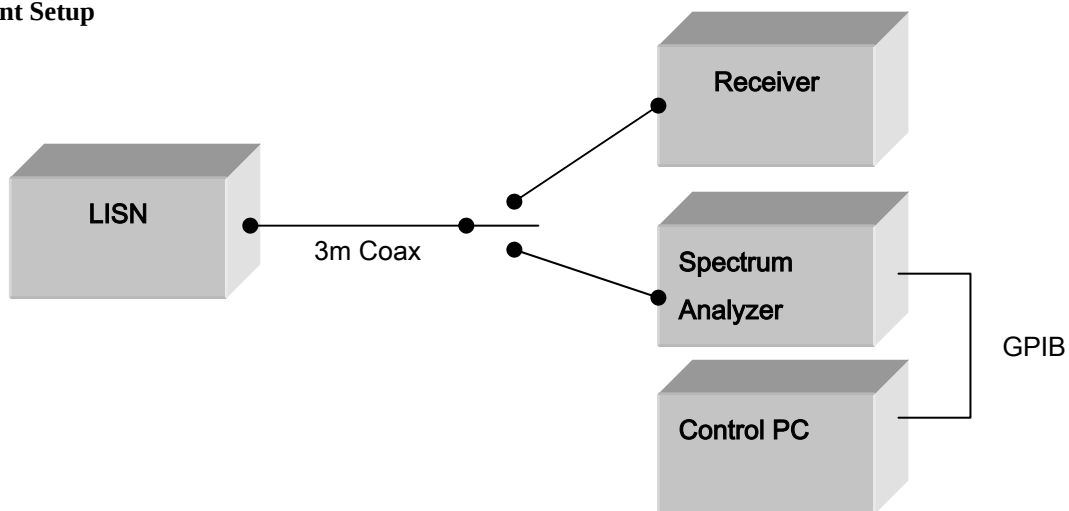
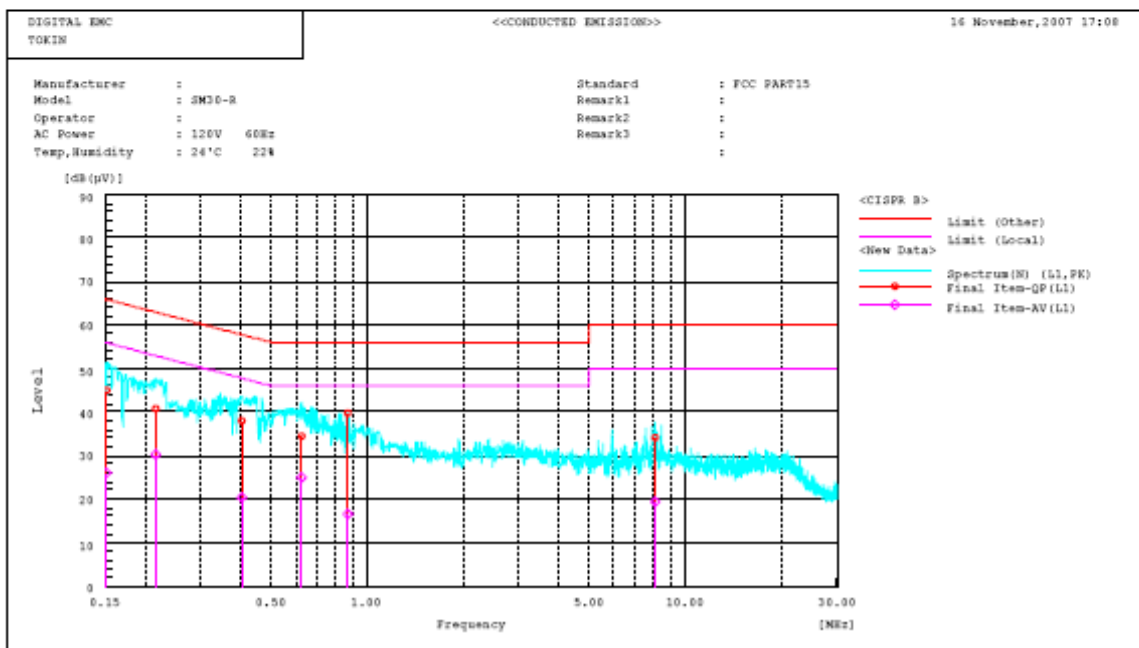
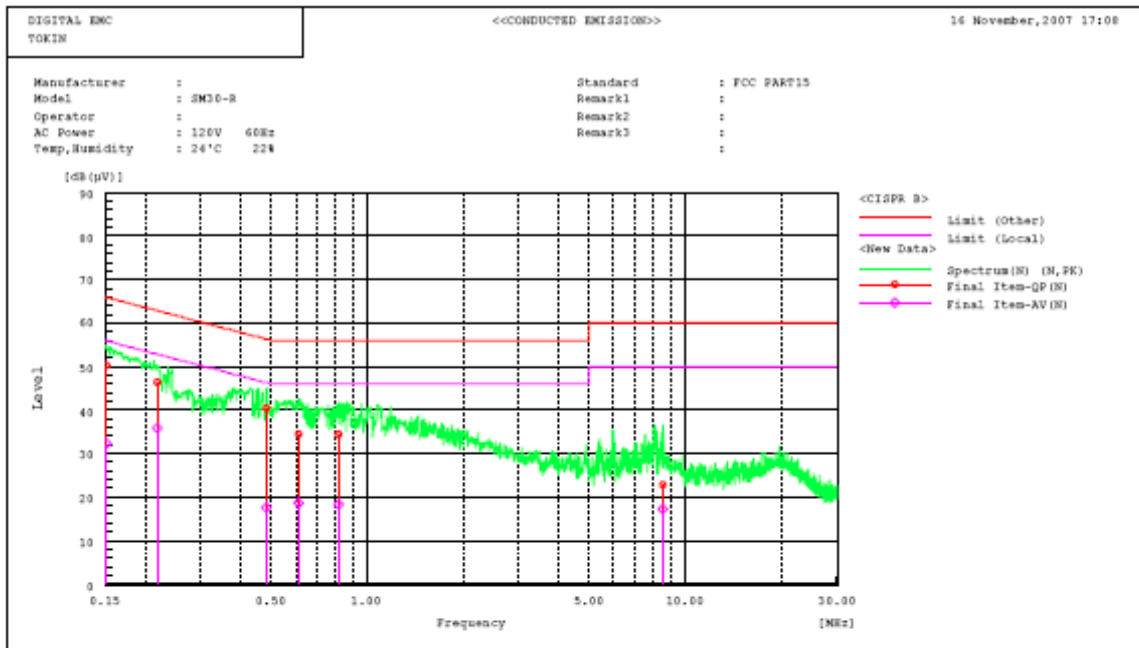


Figure 2: Measurement setup for AC Conducted Emission

AC Conducted Emissions



AC Conducted Emissions -DATA

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***** DIGITAL EMC *****
<<CONDUCTED EMISSION>>
16 November,2007 17:08

Standard      : FCC PART15
Manufacturer  :
Model         : SM30-R
Operator      :
AC Power      : 120V   60Hz
Temp./Humidity : 24°C   22%
Remark1       :
Remark2       :
Remark3       :
*****

Final Result

--- N Phase ---
No.  Frequency  Reading  Reading  c.f  Result  Result  Limit  Limit  Margin  Margin  Remark
      [MHz]    [dB(µV)] [dB(µV)] [dB] [dB(µV)] [dB(µV)] [dB(µV)] [dB(µV)] [dB] [dB]
1    0.151      50.0     32.3   0.1   50.1     32.4   65.9   55.9   15.0   23.5
2    0.220      46.4     35.9   0.1   46.5     36.0   62.8   52.8   16.3   16.8
3    0.485      40.5     17.4   0.1   40.6     17.5   56.3   46.3   15.7   28.8
4    0.609      34.5     18.7   0.1   34.6     18.8   56.0   46.0   21.4   27.2
5    0.615      34.5     18.2   0.1   34.6     18.3   56.0   46.0   21.4   27.7
6    0.569      22.5     16.8   0.5   23.0     17.3   60.0   50.0   37.0   32.7

--- L1 Phase ---
No.  Frequency  Reading  Reading  c.f  Result  Result  Limit  Limit  Margin  Margin  Remark
      [MHz]    [dB(µV)] [dB(µV)] [dB] [dB(µV)] [dB(µV)] [dB(µV)] [dB(µV)] [dB] [dB]
1    0.152      44.8     25.9   0.2   45.0     26.1   65.9   55.9   20.9   29.8
2    0.217      40.6     30.0   0.2   40.8     30.2   62.9   52.9   22.1   22.7
3    0.404      37.8     20.1   0.2   38.0     20.3   57.8   47.8   19.8   27.5
4    0.621      34.4     24.6   0.2   34.6     24.8   56.0   46.0   21.4   21.2
5    0.675      39.4     16.3   0.2   39.6     16.5   56.0   46.0   16.4   29.5
6    0.063      33.7     18.8   0.5   34.2     19.3   60.0   50.0   25.8   30.7

```


3.2.2 Radiated Emission

Procedure:

The EUT was placed on a 0.8m high wooden table inside a semi anechoic chamber. An antenna was placed at 3m distance from the EUT. Measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed on OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions

The spectrum analyzer is set to:

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 120 kHz (30MHz ~ 1 GHz)

= 1 MHz (1 GHz ~ 10th harmonic)

Distance = 3m

Trace = max hold

VBW $\geq$ RBW

Detector function = peak

Sweep = auto

Measurement Data: **Complies**

- Refer to the next page.

Fundamental / Harmonics emission: FCC Part 15.249(a)

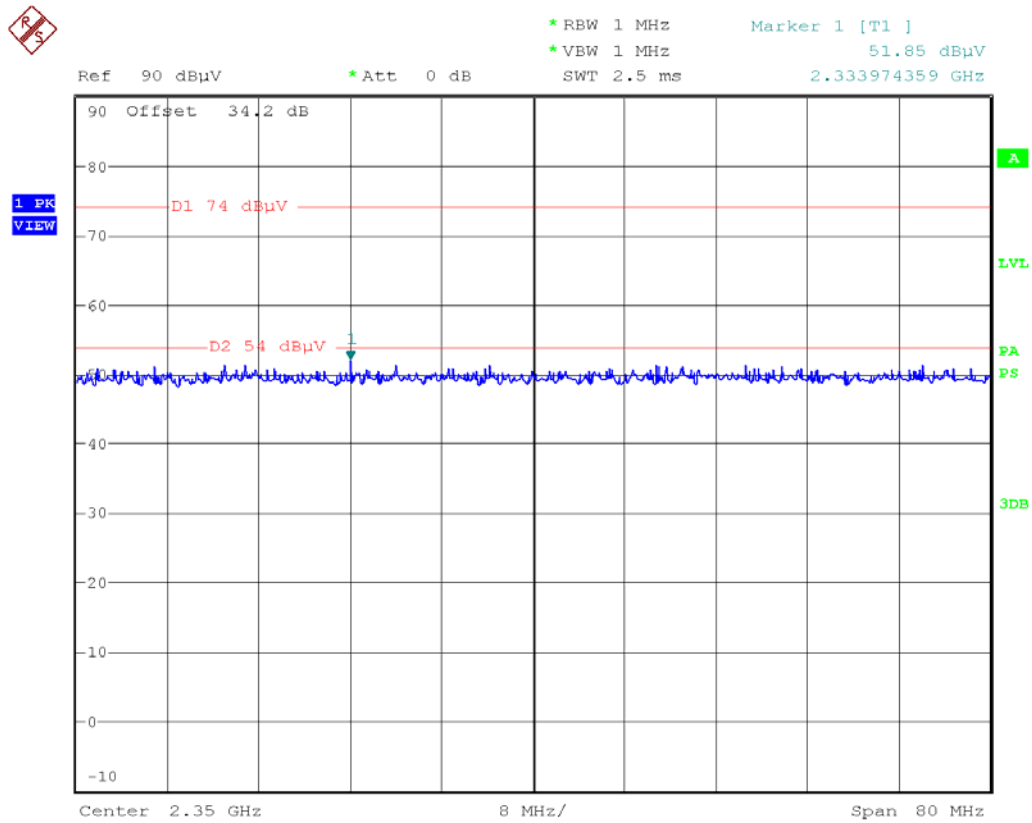
Frequency (MHz)	Limit @ 3m	
	Fundamental (mV/m)	Harmonics (uV/m)
2400 ~ 2483.5	50	500

General Standard: FCC Part 15.209(a)

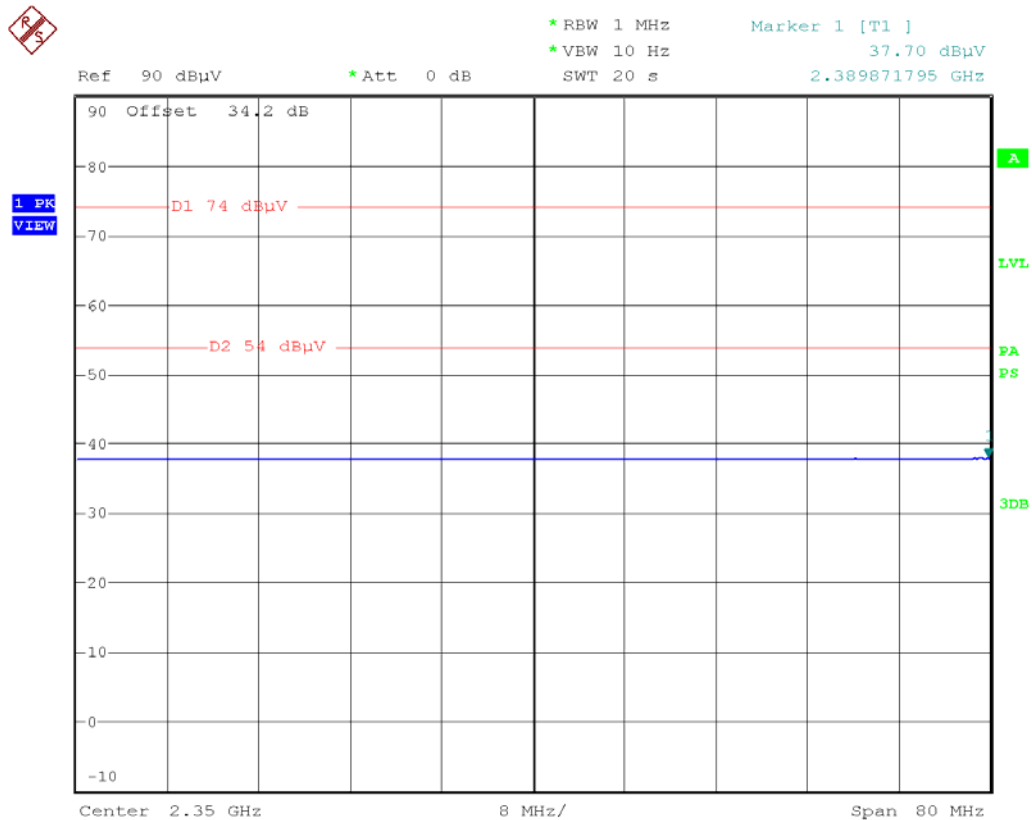
Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

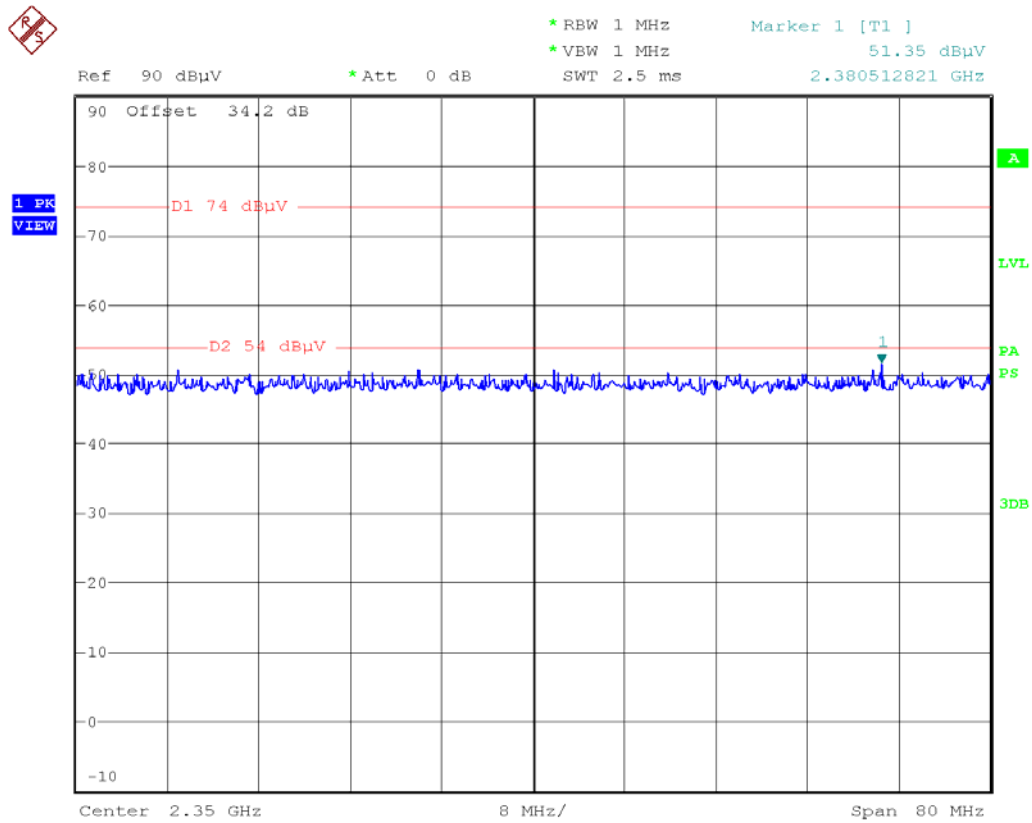
Restricted Band Edge: Low Channel (Peak, Horizontal)



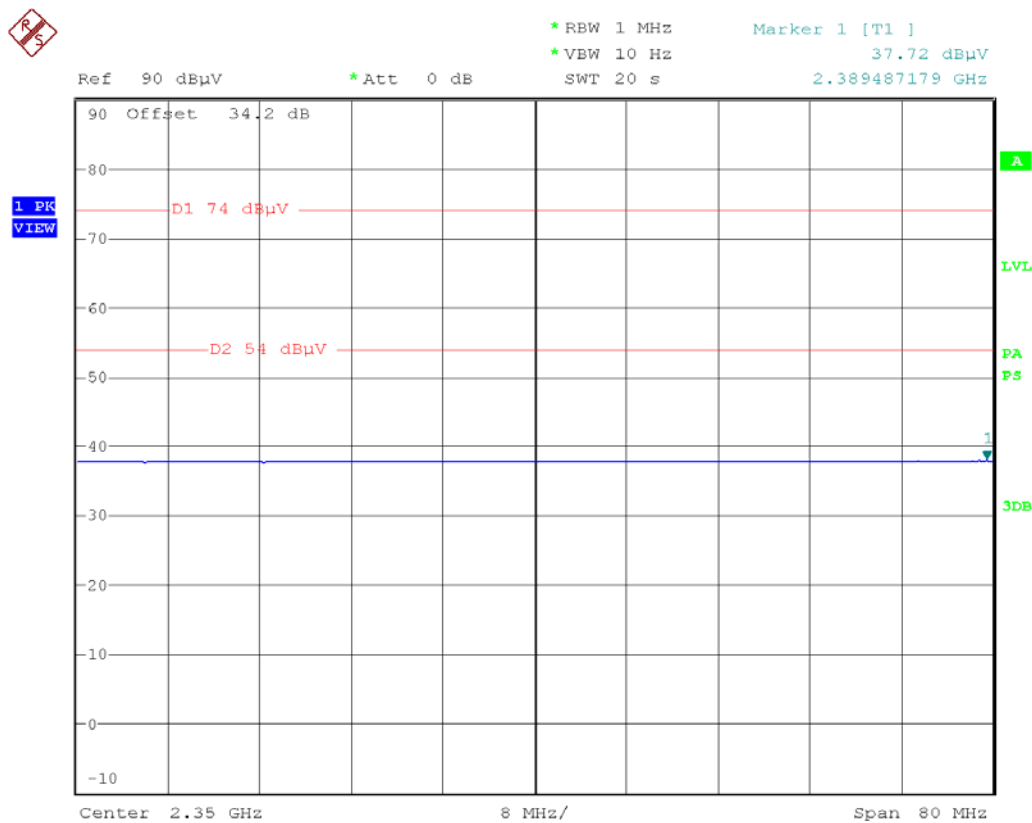
Restricted Band Edge: Low Channel (Average, Horizontal)



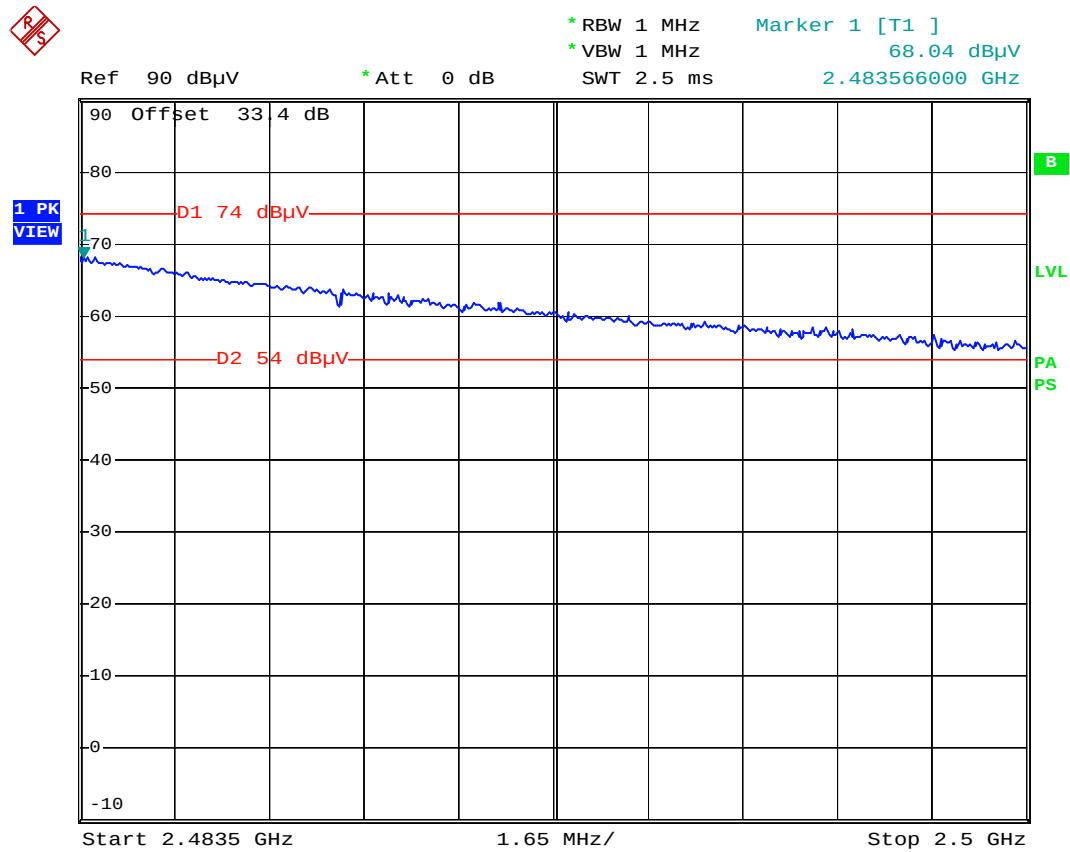
Restricted Band Edge: Low Channel (Peak, Vertical)



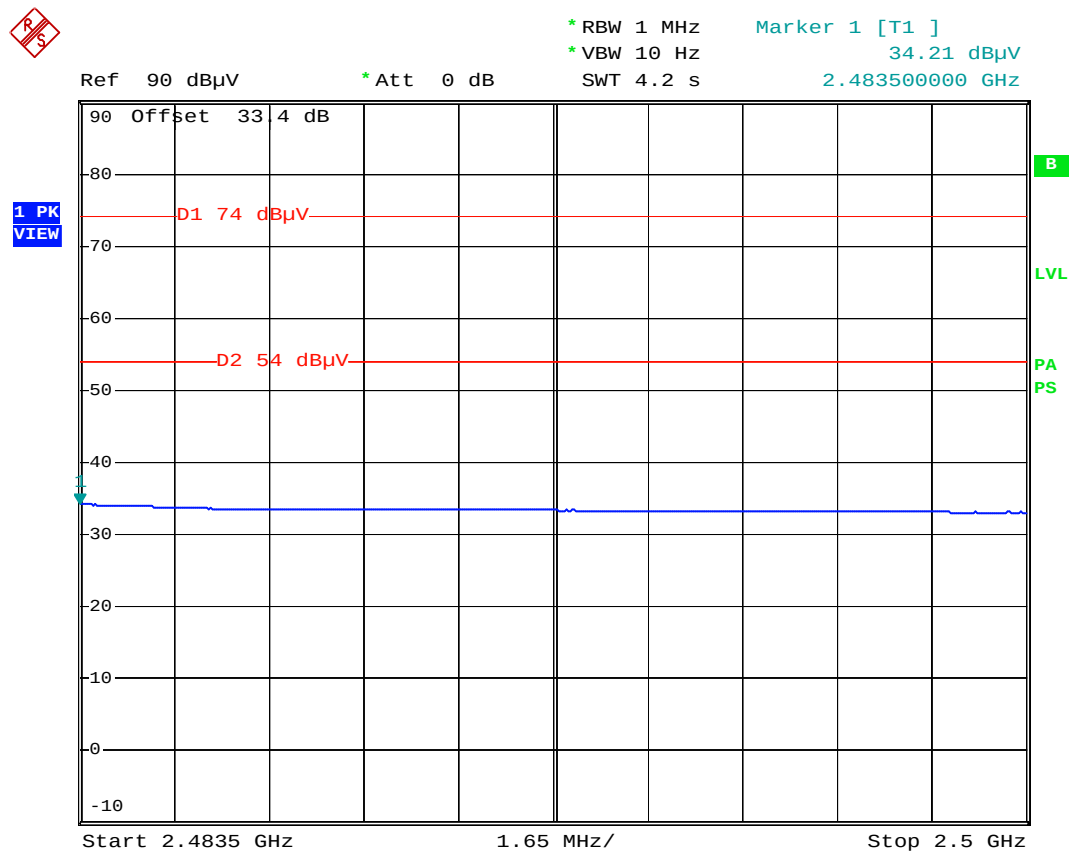
Restricted Band Edge: Low Channel (Average, Vertical)



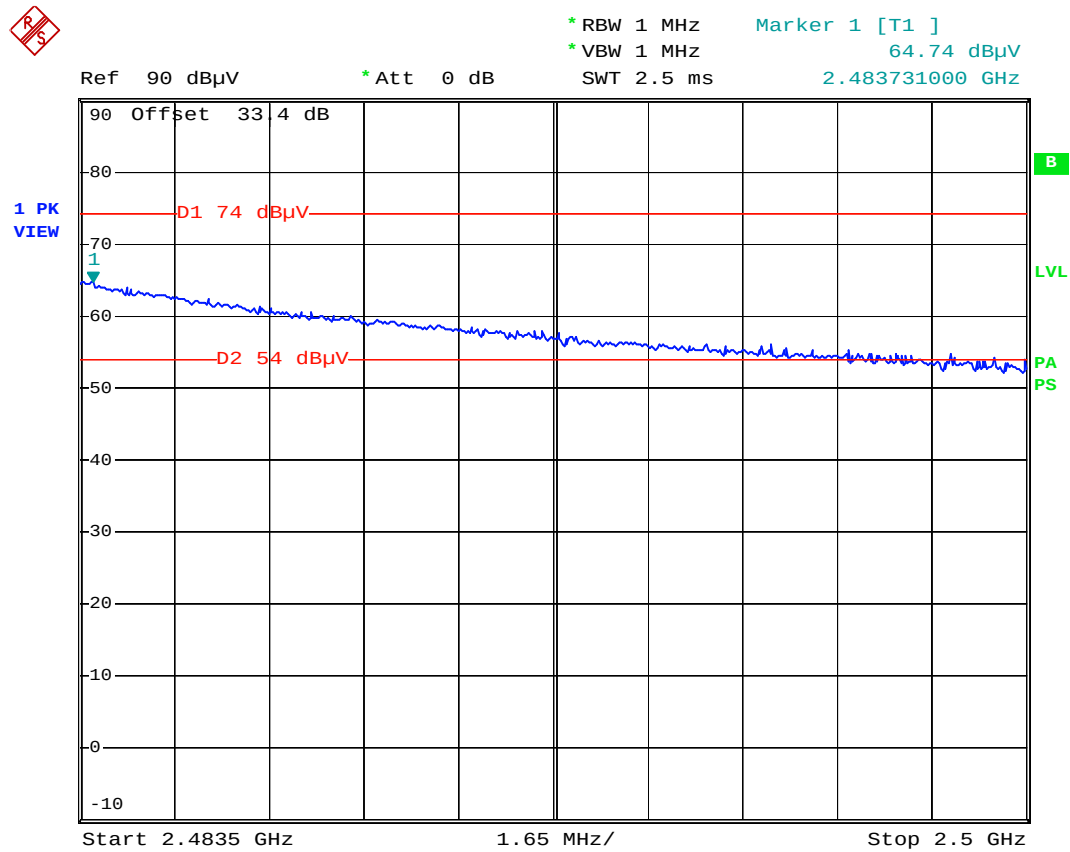
Restricted Band Edge: High Channel (Peak, Horizontal)



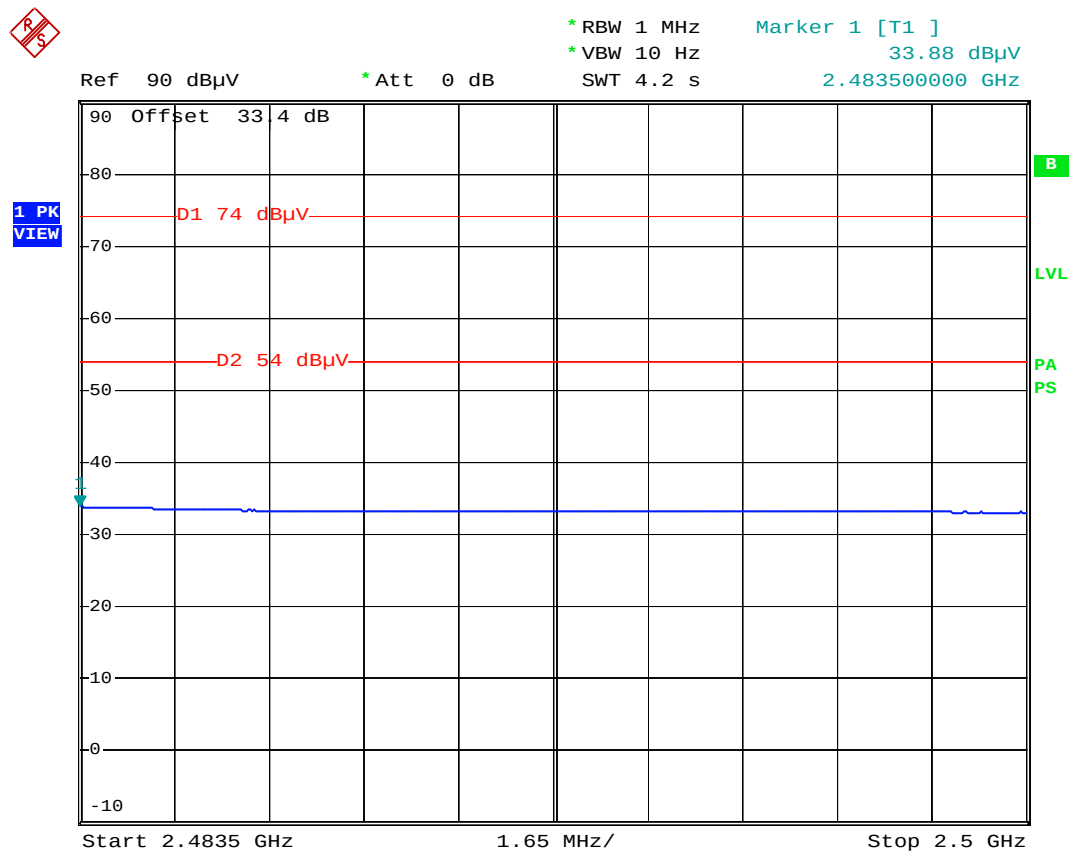
Restricted Band Edge: High Channel (Average, Horizontal)



Restricted Band Edge: High Channel (Peak, Vertical)



Restricted Band Edge: High Channel (Average, Vertical)



Fundamental Measurement Data:

Frequency (MHz)	ANT Pol	Reading(dBuV)		T.F (dB)	Result(dBuV/m)		Limit(dBuV/m)		Margin(dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
2402.8	H	84.53	44.42	-1.5	83.03	42.92	114	94	30.97	51.08
2402.8	V	90.52	45.17	-1.5	89.02	43.67	114	94	24.98	50.33
2439.6	H	88.50	44.74	-1.2	87.30	43.54	114	94	26.70	50.46
2439.6	V	81.42	43.95	-1.2	80.22	42.75	114	94	33.78	51.25
2478.0	H	86.81	44.49	-1.2	85.61	43.29	114	94	28.39	50.71
2478.0	V	81.04	43.91	-1.2	79.84	42.71	114	94	34.16	51.29

Note.

1. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

Harmonic and other emissions Measurement Data: Fundamental Frequency = 2402.8MHz

Frequency (MHz)	ANT Pol	Reading(dBuV)			T.F (dB)	Result(dBuV/m)			Limit(dBuV/m)			Margin(dB)		
		QP	PK	AV		QP	PK	AV	QP	PK	AV	QP	PK	AV
48.500	V	43.69	-	-	-12.67	31.02	-	-	40.00	-	-	8.98	-	-
478.620	H	40.81	-	-	-2.77	38.04	-	-	46.00	-	-	7.96	-	-
716.270	V	36.31	-	-	0.96	37.27	-	-	46.00	-	-	8.73	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Harmonic and other emissions Measurement Data: Fundamental Frequency = 2439.6MHz

Frequency (MHz)	ANT Pol	Reading(dBuV)			T.F (dB)	Result(dBuV/m)			Limit(dBuV/m)			Margin(dB)		
		QP	PK	AV		QP	PK	AV	QP	PK	AV	QP	PK	AV
48.500	V	43.17	-	-	-12.67	30.50	-	-	40	-	-	9.50	-	-
478.620	H	40.76	-	-	-2.77	37.99	-	-	46	-	-	8.01	-	-
716.270	V	36.72	-	-	0.96	37.68	-	-	46	-	-	8.32	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Harmonic and other emissions Measurement Data: Fundamental Frequency = 2478.0MHz

Frequency (MHz)	ANT Pol	Reading(dBuV)			T.F (dB)	Result(dBuV/m)			Limit(dBuV/m)			Margin(dB)		
		QP	PK	AV		QP	PK	AV	QP	PK	AV	QP	PK	AV
48.5	V	43.33	-	-	-12.67	30.66	-	-	40	-	-	9.34	-	-
478.62	H	41.28	-	-	-2.77	38.51	-	-	46	-	-	7.49	-	-
716.27	V	35.35	-	-	0.96	36.31	-	-	46	-	-	9.69	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were detected at a level greater than 20dB below limit.
2. If peak result meet AV limit, AV measurement is omitted.
3. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4404B	17/04/07	17/04/08	US41061134
02	Spectrum Analyzer	Agilent	E4440A	15/11/07	15/11/08	MY45304199
03	Spectrum Analyzer	H.P	8563E	09/10/07	09/10/09	3551A04634
04	Power Meter	H.P	EMP-442A	23/03/07	23/03/08	GB37170413
05	Power Sensor	H.P	8481A	23/03/07	23/03/08	3318A96566
06	Frequency Counter	H.P	5342A	06/09/07	06/09/08	2119A04450
07	Signal Generator	Rohde Schwarz	SMR20	21/03/07	21/03/08	101251
08	Signal Generator	H.P	ESG-3000A	10/07/07	10/07/08	US37230529
09	Audio Analyzer	H.P	8903B	10/07/07	10/07/08	3011A09448
10	Modulation Analyzer	H.P	8901B	14/07/07	14/07/08	3028A03029
11	Oscilloscope	Tektronix	TDS3052	14/11/07	14/11/08	B016821
12	Universal Radio Communication tester	Rohde Schwarz	CMU200	24/04/07	24/04/08	107631
13	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	18/07/07	18/07/09	GB43461134
14	Bluetooth Tester	TESCOM	TC-3000A	28/03/07	28/03/08	3000A4A0121
15	Multisystem Ue Tester	Japan Radio Co.,Ltd	NJZ-2000	20/11/06	20/11/07	ET00095
16	Power Splitter	WEINSCHL	1593	05/10/07	05/10/08	332
17	BAND Reject Filter	Microwave Circuits	N0308372	19/10/07	19/10/08	3125-01DC0312
18	BAND Reject Filter	Wainwright	WRCG1750	19/10/07	19/10/08	SN2
19	AC Power supply	DAEKWANG	5KVA	20/03/07	20/03/08	N/A
20	DC Power Supply	H.P	6622A	20/03/07	20/03/08	465487
21	Attenuator (10dB)	WEINSCHL	23-10-34	26/01/07	26/01/08	BP4387
22	HORN ANT	EMCO	3115	10/08/07	10/08/08	6419
23	HORN ANT	EMCO	3115	09/10/07	09/10/08	21097
24	HORN ANT	A.H.Systems	SAS-574	20/08/07	20/08/08	154
25	HORN ANT	A.H.Systems	SAS-574	20/08/07	20/08/08	155
26	Dipole Antenna	Schwarzbeck	VHA9103	27/11/06	27/11/07	2116
27	Dipole Antenna	Schwarzbeck	VHA9103	27/11/06	27/11/07	2117
28	Dipole Antenna	Schwarzbeck	UHA9105	27/11/06	27/11/07	2261
29	Dipole Antenna	Schwarzbeck	UHA9105	27/11/06	27/11/07	2262

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
30	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	06/09/07	06/09/08	SN-161-4
31	Frequency Converter	Kyorits	KCV-604C	21/07/07	21/07/08	4-230-3
32	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	02/10/07	02/10/08	021031
33	Log Periodic Antenna	Schwarzbeck	UHALP9108 A1	08/06/07	08/06/08	1098
34	Biconical Antenna	Schwarzbeck	VHA9103	08/06/07	08/06/08	2233
35	Digital Multimeter	H.P	34401A	20/03/07	20/03/08	3146A13475
36	Attenuator (10dB)	WEINSCHEL	23-10-34	05/10/07	05/10/08	BP4386
37	High-Pass Filter	ANRITSU	MP526D	08/10/07	08/10/08	MP27756
38	Attenuator (3dB)	Agilent	8491B	12/07/07	12/07/08	58177
39	Amplifier (25dB)	Agilent	8447D	08/08/07	08/08/08	2944A10144
40	Amplifier (30dB)	Agilent	8449B	25/10/07	25/10/08	3008A01590
41	Position Controller	TOKIN	5901T	N/A	N/A	14173
42	Driver	TOKIN	5902T2	N/A	N/A	14174
43	Spectrum Analyzer	H.P	8591E	16/04/07	16/04/08	3649A05889
44	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	06/10/07	06/10/08	4N-170-3
45	LISN	Kyorits	KNW-407	30/08/07	30/08/08	8-317-8
46	LISN	Kyorits	KNW-242	06/10/07	06/10/08	8-654-15
47	CVCF	NF Electronic	4400	N/A	N/A	344536 4420064
48	Software	ToYo EMI	EP5/RE	N/A	N/A	Ver 2.0.800
49	Software	ToYo EMI	EP5/CE	N/A	N/A	Ver 2.0.801
50	Software	AUDIX	e3	N/A	N/A	Ver 3.0
51	Software	Agilent	Benchlink	N/A	N/A	A.01.09 021211