EMC
TEST REPORT

Report No. : EME-010333
Model No. : AV-T2G4
Issued Date : May 14, 2001

Applicant : ELANsat Technologies Inc.
No. 11, Lane 19, Pateh Road, Hsinchu, Taiwan, R.O.C.

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Ko-Tze-Nan Chia-Tung Li, Shiang-Shan District, Hsinchu, Taiwan, R.O.C.

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1. Summary of Tests

2.4GHz Wireless A/V Transmitter -Model: AV-T2G4
FCC ID: PNK2G4-AV

Test	Reference	Results
Conducted Emission	15.207	Complies
Radiated Emission	15.249	Complies
Spurious Emission	15.209	Complies
Band-edge test	15.249(c)	Complies

1.1 General Information

1.2 Identification of the EUT

Manufacturer	: ELANsat Technologies Inc.
Product	: 2.4GHz Wireless A/V Transmitter
Model No.	: AV-T2G4
FCC ID.	: PNK2G4-AV
Frequency Range	: 2414MHz to 2468MHz
Channel Number	: 4 channels
Frequency of Each Channel	: 2414MHz, 2432MHz, 2450MHz, 2468MHz
Type of Modulation	: FM
Power Supply	: 120Vac, 60Hz to 9Vdc adapter (DV-9300S)
Power Cord	: N/A
Sample Received	: April 20, 2001
Test Date(s)	: May 2, 2001 to May 11, 2001

The attached antenna on antenna port is a fixed internal antenna, no consideration of replacement. (Please refer to the photo attached as an appendix.)

1.3 Additional information about the EUT

The main function of AV-T2G4 Video Sender is to send the video and audio signals to receiver unit by 2.4GHz RF signal and do the FM demodulation, then put the video and audio signals to TV, or other AV device.

1.4 Test Standard

The equipment under test (EUT) is a Video Sender. The transmitter portion is subject to the FCC Part 15 Subpart C Section 15.249 evaluation. Test date is included in this report.

For more detail features, please refer to user's Manual.

1.5 Support equipment

1. DVD
   Product No. : RDP-702
   Serial No. : P13C193100769
   Manufacturer : Royal Tek

2. Monitor
   Product No. : DCT-14CP
   Serial No. : 00020092
   Manufacturer : Acula Technology Corporation

2. Test Condition

2.1 Test Standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section 15.249.

The AC power conducted emissions was invested over the frequency range from 0.45MHz to 30MHz using a receiver bandwidth of 9kHz.

Radiated emissions were invested over the frequency range from 30MHz to 1000MHz using a receiver bandwidth of 120kHz and the frequency range from 1GHz to 24GHz using a receiver bandwidth of 1MHz.

Radiated emission testing was performed at a 3-meter open field test site.

The EUT setup configuration describes as follows:

The signal was generated from DVD Player and was transmitted to transmitter, then to receiver module through radiated emission, finally to TV display via connected cable. The TV display was used to monitor if the whole function and operation of transmission was accurate.

2.2 Modifications Required for Compliance

No modification were installed during test performance to bring the product into compliance (Please note that this list does not include changes made specifically by ELANsat Technologies Inc. Prior to compliance testing.)

2.3 Test Equipment

Conducted Emission

Equipment	Brand	Model No.	Series No.
EMI Receiver	Rohde & Schwarz	ESCS 30	825788/014
EMI Receiver	Rohde & Schwarz	ESMI	825428/005
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	848.766/052

Note:
1. The calibration interval of the above instruments is 12 months.

Radiated Emission

Equipment	Brand	Model No.	Series No.
EMI Receiver	Rohde & Schwarz	ESCS 30	825788/014
EMI Spectrum	Rohde & Schwarz	ESMI	825428/005
Pre-Amplifier	Advantest	BB525C	83120047
Horn Antenna	EMCO	3115	9906-5822
Turn Table	Electro-Metrics	EM4710	350101
Bilog Antenna	Electro-Metrics	EM-6917-1	N/A
Antenna Tower	Electro-Metrics	EM-4720	410109

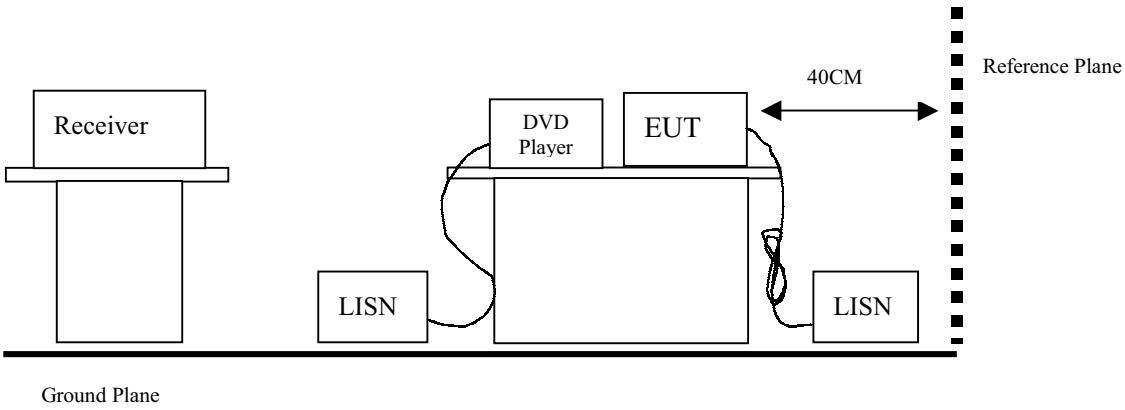
Note:
1. The calibration interval of the above instruments is 12 months.

3. Conducted emission test FCC 15.207

3.1 Operating Environment

Temperature: 23 ℃
Relative Humidity: 63 %

3.2 Test Setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/1992 on conducted measurement.
The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

3.3 Emission Limit

FCC Part 15 Paragraph 15.207		
Freq. (MHz)	Maximum RF Line Voltage	
	uV	dBuV
0.45 - 30	250	48.0

3.4 Conducted Emission Data FCC 15.207

Worst Case Conducted Emission
at Channel 4, Neutral 0.53594MHz ,margin:-15.7 dB

EUT : AV-T2G4
Test Mode : Channel 1
Worst Case Condition : Transmitter Mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	0.45	28.5	48	-19.50
LINE	5.282	21.6	48	-26.40
LINE	7.282	16.7	48	-31.30
LINE	15.85	25.3	48	-22.70
LINE	22.898	22.3	48	-25.70
NEUTRAL	0.578	31.8	48	-16.20
NEUTRAL	5.282	20.2	48	-27.80
NEUTRAL	7.282	19.3	48	-28.70
NEUTRAL	15.858	20.5	48	-27.50
NEUTRAL	23.274	19.2	48	-28.80

Remark:
1. The reading value including cable loss and LISN factor.
2. The average measurement was not performed when the peak measured data under the limit of average detection.

EUT : AV-T2G4
Test Mode : Channel 2
Worst Case Condition : Transmitter Mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	0.45	28.6	48	-19.40
LINE	5.282	17.3	48	-30.70
LINE	15.85	28	48	-20.00
LINE	22.898	21.9	48	-26.10
NEUTRAL	0.552	32.1	48	-15.90
NEUTRAL	1.29	11.6	48	-36.40
NEUTRAL	15.85	27.9	48	-20.10
NEUTRAL	22.898	22.9	48	-25.10

Remark:
1. 1. The reading value included cable loss and LISN factor.
2. The average measurement was not performed when the peak measured data under the limit of average detection.

EUT : AV-T2G4
Test Mode : Channel 4
Worst Case Condition : Transmitter Mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	0.45781	28.4	48	-19.60
LINE	0.52031	25.7	48	-22.30
LINE	0.575	22.1	48	-25.90
LINE	15.84844	27.4	48	-20.60
NEUTRAL	0.53594	32.3	48	-15.70
NEUTRAL	0.65703	29.6	48	-18.40
NEUTRAL	0.7	27	48	-21.00
NEUTRAL	15.85234	27.8	48	-20.20
NEUTRAL	23.5711	19.5	48	-28.50

Remark:
1. 1. The reading value included cable loss and LISN factor.
2. The average measurement was not performed when the peak measured data under the limit of average detection.

3.4.1 Conducted Emission Configuration Photograph

For electronic filing, the worst case conducted emission configuration photographs are saved with filename: **CE1.pdf, CE2.pdf**

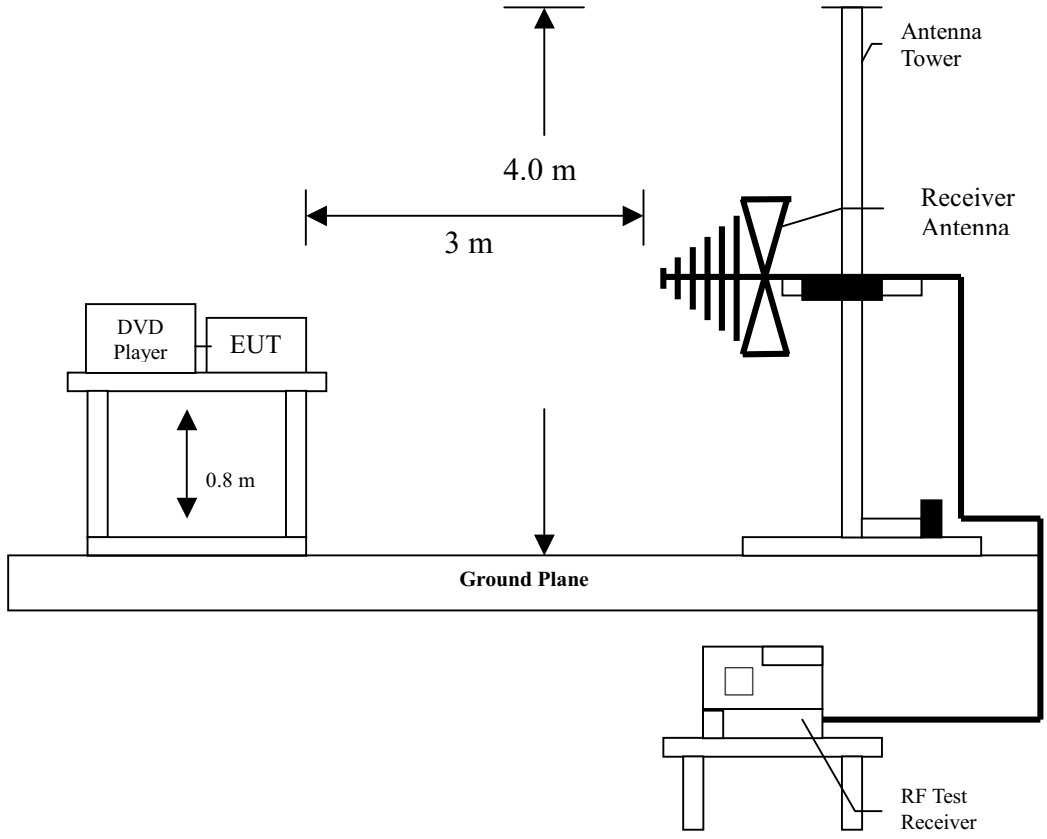
4. Radiated Emission Test FCC 15.249 (C)

4.1 Operating Environment

Temperature:	16	℃
Relative Humidity:	62	%

4.2 Test Setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



The signal is maximized through rotation and placement in the three orthogonal axes.
Radiated emission measurement were performed from 30MHz to tenth harmonics.
The EUT and its peripherals are placed on a turn table which is 0.8 meter above ground.
The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4/1992 on radiated measurement.
The bandwidth below 1GHz setting on the field strength meter (R&S Receiver ESCS 30) is 120kHz and above 1GHz is 1MHz.

4.3 Radiated Emission Limit

4.3.1 Fundamental and Harmonics Emission Limits

Frequency (MHz)	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m@3m)	(dBuV/m@3m)	(mV/m@3m)	(dBuV/m@3m)
2400-2483.5	50	94(Average)	500	54(Average)
		114 (Peak)		74(Peak)

4.3.2 General Radiated Emission Limits

Emissions 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 paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	50dB below of the fundamental (dB μ V/m @3m)	15.209 Limits (dB μ V/m@3m)	General Radiated Limits (dB μ V/m@3m)
30-88	40	40	40
88-216	43.5	43.5	43.5
216-960	44	46	46
Above 960	44	54	54

Remark:
1. RF Line Voltage (dB μ V) = 20 log RF Line Voltage(μ V)
2. In the above table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

4.4 Radiated Emission Test Data FCC 15.249

Worst Case Radiated Emission
at Channel 4, 7406.56 MHz, margin: -0.82 dB

4.4.1 Fundamental & Harmonics Radiated Emission Data

EUT : AV-T2G4
Test Mode : Channel 1
Worst Case Condition : Transmitter Mode

Freq. (MHz)	Spec. Analyz Detector	Antenna Polariz. (H/V)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3m (dBuV/m)	Margin (dB)
2415.02	PK	V	59.05	29.2	1.4	89.65	114	-24.35
2415.02	AV	V	50.01	29.2	1.4	80.61	94	-13.39
*4829.58	PK	V	21.96	34.1	2.05	58.11	74	-15.89
*4829.58	AV	V	13.02	34.1	2.05	49.17	54	-4.83
*7245.1	PK	V	21.62	37.6	2.4	61.62	74	-12.38
*7245.1	AV	V	8.4	37.6	2.4	48.4	54	-5.6
9660.9	PK	V	14.74	38.7	3.08	56.52	74	-17.48
9660.9	AV	V	2.66	38.7	3.08	44.44	54	-9.56
*12078.8	PK	V	8.68	39.7	3.71	52.09	74	-21.91
*12078.8	AV	V	-2.69	39.7	3.71	40.72	54	-13.28

Remark:
1. Corrected Level = Reading Level + Antenna Factor + Cable Loss
2. All Readings below 1GHz are Quasi-Peak, above are average value
3. All the Harmonics don't show on the above table were undetectable.

* Emission within the restricted band meets the requirement of part 15.205.
The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000MHz.

EUT : AV-T2G4
Test Mode : Channel 1
Worst Case Condition : Transmitter Mode

Freq. (MHz)	Spec. Analyz Detector	Antenna Polariz. (H/V)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3m (dBuV/m)	Margin (dB)
2415.19	PK	H	62.85	29.2	1.4	93.45	114	-20.55
2415.19	AV	H	53.05	29.2	1.4	83.65	94	-10.35
*4829.58	PK	H	23.76	34.1	2.05	59.91	74	-14.09
*4829.58	AV	H	13.81	34.1	2.05	49.96	54	-4.04
*7244.66	PK	H	22.39	37.6	2.4	62.39	74	-11.61
*7244.66	AV	H	10.51	37.6	2.4	50.51	54	-3.49
9660.46	PK	H	15.81	38.7	3.08	57.59	74	-16.41
9660.46	AV	H	1.04	38.7	3.08	42.82	54	-11.18
*12078.8	PK	H	8.6	39.7	3.71	52.01	74	-21.99
*12078.8	AV	H	-2.75	39.7	3.71	40.66	54	-13.34

Remark:
1. Emission Level = Reading Level + Antenna Factor + Cable Loss
2. All Readings below 1GHz are Quasi-Peak, above are average value
3. All the Harmonics don't show on the above table were undetectable.

* Emission within the restricted band meets the requirement of part 15.205.
The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000MHz.

EUT : AV-T2G4
Test Mode : Channel 2
Worst Case Condition : Transmitter Mode

Freq. (MHz)	Spec. Analyz Detector	Antenna Polariz. (H/V)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3m (dBuV/m)	Margin (dB)
2433.02	PK	V	60.2	29.2	1.4	90.8	114	-23.2
2433.02	AV	V	52.3	29.2	1.4	82.9	94	-11.1
*4865.83	PK	V	25.09	34.1	2.05	61.24	74	-12.76
*4865.83	AV	V	14.4	34.1	2.05	50.55	54	-3.45
*7299.27	PK	V	21.6	37.6	2.4	61.6	74	-12.4
*7299.27	AV	V	6.98	37.6	2.4	46.98	54	-7.02
9733.44	PK	V	12.86	38.7	3.08	54.64	74	-19.36
9733.44	AV	V	0.17	38.7	3.08	41.95	54	-12.05
*12166.61	PK	V	7.83	39.7	3.71	51.24	74	-22.76
*12166.61	AV	V	-2.03	39.7	3.71	41.38	54	-12.62

Remark:
1. Emission Level = Reading Level + Antenna Factor + Cable Loss
2. All Readings below 1GHz are Quasi-Peak, above are average value
3. All the Harmonics don't show on the above table were undetectable.

* Emission within the restricted band meets the requirement of part 15.205.
The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000MHz.

EUT : AV-T2G4
Test Mode : Channel 2
Worst Case Condition : Transmitter Mode

Freq. (MHz)	Spec. Analyz Detector	Antenna Polariz. (H/V)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3m (dBuV/m)	Margin (dB)
2432.88	PK	H	59.54	29.2	1.4	90.14	114	-23.86
2432.88	AV	H	52.63	29.2	1.4	83.23	94	-10.77
*4866.24	PK	H	22.42	34.1	2.05	58.57	74	-15.43
*4866.24	AV	H	10.71	34.1	2.05	46.86	54	-7.14
*7298.72	PK	H	22.13	37.6	2.4	62.13	74	-11.87
*7298.72	AV	H	10.01	37.6	2.4	50.01	54	-3.99
9733.77	PK	H	23.13	38.7	3.08	64.91	74	-9.09
9733.77	AV	H	8.45	38.7	3.08	50.23	54	-3.77
*12166.61	PK	H	8.27	39.7	3.71	51.68	74	-22.32
*12166.61	AV	H	-2.14	39.7	3.71	41.27	54	-12.73

Remark:
1. Emission Level = Reading Level + Antenna Factor + Cable Loss
2. All Readings below 1GHz are Quasi-Peak, above are average value
3. All the Harmonics don't show on the above table were undetectable.

* Emission within the restricted band meets the requirement of part 15.205.
The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000MHz.

EUT : AV-T2G4
Test Mode : Channel 4
Worst Case Condition : Transmitter Mode

Freq. (MHz)	Spec. Analyz Detector	Antenna Polariz. (H/V)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3m (dBuV/m)	Margin (dB)
2469.15	PK	V	56.68	29.2	1.4	87.28	114	-26.72
2469.15	AV	V	46.54	29.2	1.4	77.14	94	-16.86
*4937.48	PK	V	24.14	34.1	2.05	60.29	74	-13.71
*4937.48	AV	V	14.75	34.1	2.05	50.9	54	-3.1
*7406.56	PK	V	25.16	37.6	2.4	65.16	74	-8.84
*7406.56	AV	V	13.18	37.6	2.4	53.18	54	-0.82
9875.77	PK	V	19.17	38.7	3.08	60.95	74	-13.05
9875.77	AV	V	7.23	38.7	3.08	49.01	54	-4.99
*12344.3	PK	V	7.32	39.7	3.71	50.73	74	-23.27
*12344.3	AV	V	-2.42	39.7	3.71	40.99	54	-13.01

Remark:
1. Emission Level = Reading Level + Antenna Factor + Cable Loss
2. All Readings below 1GHz are Quasi-Peak, above are average value
3. All the Harmonics don't show on the above table were undetectable.

* Emission within the restricted band meets the requirement of part 15.205.
The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000MHz.

EUT : AV-T2G4
Test Mode : Channel 4
Worst Case Condition : Transmitter Mode

Freq. (MHz)	Spec. Analyz Detector	Antenna Polariz. (H/V)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Reading (dBuV/m)	Limit At 3m (dBuV/m)	Margin (dB)
2469.02	PK	H	59.41	29.2	1.4	90.01	114	-23.99
2469.02	AV	H	50.47	29.2	1.4	81.07	94	-12.93
*4937.38	PK	H	24.03	34.1	2.05	60.18	74	-13.82
*4937.38	AV	H	16	34.1	2.05	52.15	54	-1.85
*7406.37	PK	H	25.13	37.6	2.4	65.13	74	-8.87
*7406.37	AV	H	12.97	37.6	2.4	52.97	54	-1.03
9875.73	PK	H	16.46	38.7	3.08	58.24	74	-15.76
9875.73	AV	H	5.05	38.7	3.08	46.83	54	-7.17
*12344.3	PK	H	8.16	39.7	3.71	51.57	74	-22.43
*12344.3	AV	H	-2.01	39.7	3.71	41.4	54	-12.6

Remark:
1. Emission Level = Reading Level + Antenna Factor + Cable Loss
2. All Readings below 1GHz are Quasi-Peak, above are average value
3. All the Harmonics don't show on the above table were undetectable.

* Emission within the restricted band meets the requirement of part 15.205.
The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000MHz.

4.5 General Radiated Emission Data FCC 15.209

Worst Case Radiated Emission
at Polarization Horizontal, 868.08 MHz, margin: -18.18 dB

4.5.1 General Radiated Emission Data

EUT : AV-T2G4
Worst Case Condition : Transmitter Mode

Polar (circle)	Freq. (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
VER.	32.91	14.4	1.68	0.16	16.24	40	-23.76
VER.	94.9	6.83	2.3	0.09	9.22	43.5	-34.28
VER.	104.69	8.64	2.45	7.11	18.20	43.5	-25.30
VER.	438.37	16.97	4.75	-1.38	20.34	46	-25.66
HOR.	104.69	8.64	2.45	7.49	18.58	40	-21.42
HOR.	438.37	16.97	4.75	-0.18	21.54	46	-24.46
HOR.	868.08	22.21	6.7	-1.09	27.82	46	-18.18

Remark:
1. Emission Level = Reading Level + Antenna Factor + Cable Loss
2. All Readings below 1GHz are Quasi-Peak, above are average value
3. All the Harmonics don't show on the above table were undetectable.

4.5.2 Radiated Emission Configuration Photograph

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: **opensite-setup.pdf**

4.6 Radiated Emission on the band edge FCC 15.249(C)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental (2400~2468MHz). Please refer to the attachment plots.

Test Result:
Band-edge test result please refers to filename: **bd-low.pdf,**
bd-high.pdf