EMC
TEST REPORT

Report No.: **EME-050836**
Model No.: **EF-6215, DX-MP3FM**
Issued Date: **Aug. 11, 2005**

Applicant: **Procare International Co.**
11F. –6, 410, Chung Hsiao E. Rd., Sec. 5, Taipei, Taiwan

Test By: **Intertek Testing Services Taiwan Ltd.**
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

Project Engineer

Kevin Chen

Reviewed By

Jerry Liu

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Summary of Tests

FM Transmitter -Model: EF-6215
FCC ID: POSEF-6215

Test	Reference	Results
Bandwidth of fundamental frequency	15.239(a)	Complies
Field strength of fundamental frequency	15.239(b)	Complies
Radiated emission	15.239(c), 15.209	Complies
Power Line Conducted Emission test	15.207	Complies

1. General information

1.1 Identification of the EUT

Applicant:	Procare International Co.
Product:	FM Transmitter
Model No.:	EF-6215
FCC ID.:	POSEF-6215
Frequency Range:	88.1MHz to 107.9MHz
Channel Number:	199 channels
Frequency of Each Channel:	88.1+ 0.1k MHz, k=0,1~198
Type of Modulation:	FM
Power Supply:	1. 5Vdc from vehicle charger 2. 3Vdc with battery × 2
Power Cord:	N/A
Sample Received:	Aug. 1, 2005
Test Date(s):	Aug. 1, 2005 ~ Aug. 11, 2005

A DoC report has been generated for the client.

1.2 Additional information about the EUT

Memory the latest frequency when press open button.
Memory store 10 (M1-M10)pcs optional selected frequency by user.
Memory frequency operate step:

a.Press frequency select button(+/-) select frequency you want to store.(i.e:88.1MHZ)

b.Press memory button around 2 seconds.M1 turn into glint state.With frequency select button(+/-) select memory spot you want store(i.e:M5).

c.Press memory button confirm.Frequency 88.1 MHZ memory in M5 spot.

Cancel memory frequency operate step:

a.Press memory button rapidly.Press one time the frequency spot autoskip to next memory spot.Cycle between M1 to M10.

The model DX-MP3FM is identical to model EF-6215 (EUT), the difference model number for difference brand serves as marketing strategy.

For more detail features, please refer to User's manual as file name “Installation guide.pdf”

1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain: 0dBi
Antenna Type: PCB Printed
Connector Type: N/A

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section §15.239、§15.207 and ANSI C63.4/2001.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

Put the Brand-new battery × 2 and a 12Vdc vehicle charger transfer to 5Vdc Adapter.

Input a 1kHz voice source and turn on the EUT.

The EUT was tested in the status of continuously transmitting.

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Intertek ID No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	EC303	04/17/2006
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	EC317	08/07/2006
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/24/2006
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	EC368	02/20/2006
Controller	HDGmbH	N/A	HD 100	EP317-1	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP317-2	N/A
Turn Table	HDGmbH	N/A	DS 420S	EP317-3	N/A
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	01/13/2006

Note: The above equipments are within the valid calibration period.

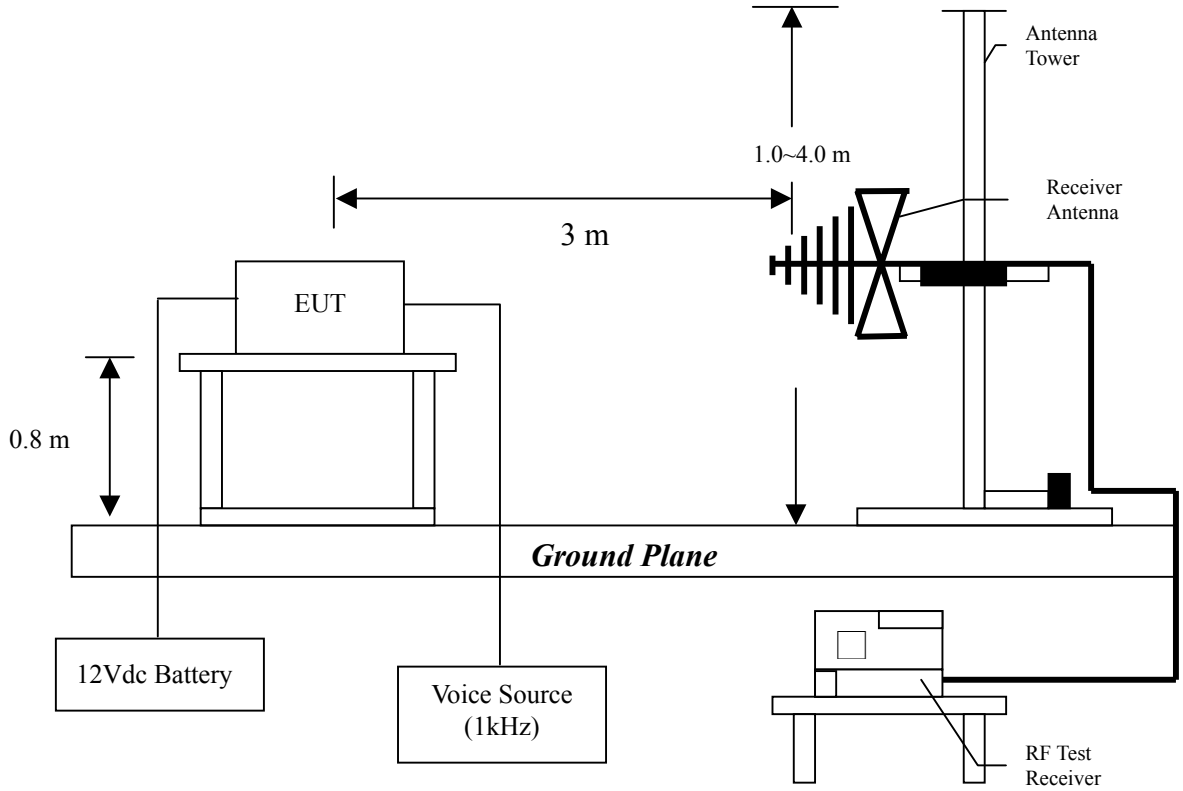
3. Radiated emission test FCC 15.239 (b)/(c)

3.1 Operating environment

Temperature:	22	℃
Relative Humidity:	55	%
Atmospheric Pressure:	1023	hPa

3.2 Test setup & procedure

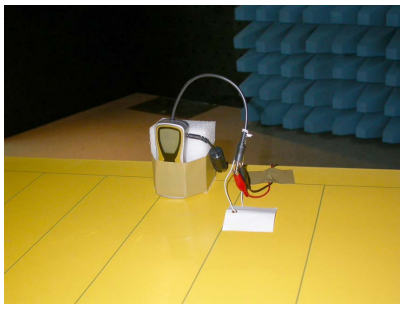
The Diagram below shows the test setup, which is utilized to make these measurements.



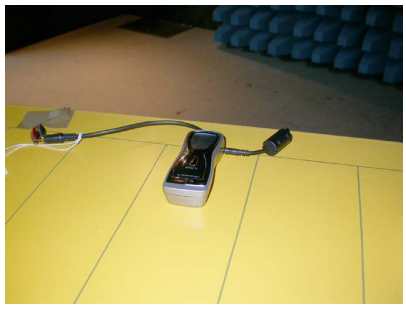
The signal is maximized through rotation and placement in the three orthogonal axes. Radiated emissions were invested cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report.
The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

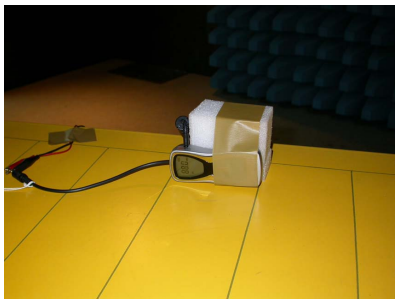
The signal is maximized through rotation and placement in the three orthogonal axes.



Setup 1



Setup 2



Setup 3

The EUT configuration please refer to the "Spurious set-up photo.pdf".

3.3 Emission limit

3.3.1 Fundamental and harmonics emission limits

Frequency (MHz)	Field Strength of Fundamental	
	(uV/m@3m)	(dBuV/m@3m)
88-108	250	48

The emission limit above is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

3.3.2 General radiated emission limits

Frequency MHz	15.209 Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:
1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of radiated emission measurement is ±4.98 dB.

3.4 Radiated emission test data
3.4.1 Fundamental Radiated Emission Data

EUT : EF-6215
Test Condition : Setup 1 Tx at 88.1MHz, 98MHz & 107.9MHz

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
88.100	PK	V	8.50	36.29	44.79	48.00	-3.22	100.00	124.00
88.100	PK	H	9.45	37.28	46.73	48.00	-1.28	100.00	149.00
98.000	PK	V	7.38	37.46	44.84	48.00	-3.17	100.00	121.00
98.000	PK	H	7.93	35.36	43.29	48.00	-4.72	100.00	165.00
107.900	PK	V	7.64	38.26	45.90	48.00	-2.10	100.00	112.00
107.900	PK	H	9.03	35.30	44.33	48.00	-3.68	100.00	147.00

Remark:
1.Corrected Level = Reading + Correction Factor
2.Correction Factor = Antenna Factor + Cable Loss

3.4.2 Radiated Emission Data

The radiated emissions at

Frequency (MHz)	Margin
176.200	-4.43
440.500	-2.03
616.700	-2.30
616.700	-3.80
196.000	-0.28
588.000	-1.68
196.000	-2.46
490.000	-4.67
588.000	-3.72
686.000	-3.85
215.800	-3.10
431.600	-2.38
598.420	-1.34
679.900	-4.33
215.800	-3.75
598.420	-1.72
679.900	-4.83

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

EUT : EF-6215
Worst Case : Setup 1 Tx at 88.1MHz

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
176.200	QP	V	14.96	24.12	39.08	43.50	-4.43	100.00	113.00
264.300	QP	V	12.76	26.88	39.64	46.00	-6.36	100.00	136.00
352.400	QP	V	15.06	23.45	38.51	46.00	-7.49	100.00	122.00
440.500	QP	V	17.64	26.33	43.97	46.00	-2.03	100.00	157.00
616.700	QP	V	20.75	22.95	43.70	46.00	-2.30	100.00	166.00
176.200	QP	H	13.48	22.33	35.81	43.50	-7.70	100.00	151.00
264.300	QP	H	12.88	25.34	38.22	46.00	-7.78	100.00	128.00
352.400	QP	H	15.48	21.65	37.13	46.00	-8.88	100.00	154.00
440.500	QP	H	18.12	20.49	38.61	46.00	-7.39	100.00	122.00
616.700	QP	H	20.88	21.33	42.21	46.00	-3.80	100.00	165.00

Remark:
1.Corrected Level = Reading Level + Correction Factor
2.Correction Factor = Antenna Factor + Cable Loss

EUT : EF-6215
Worst Case : Setup 1 Tx at 98MHz

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
196.000	QP	V	12.00	31.22	43.22	43.50	-0.28	100.00	174.00
294.000	QP	V	13.95	25.45	39.40	46.00	-6.60	100.00	162.00
359.800	QP	V	15.06	23.98	39.04	46.00	-6.96	100.00	129.00
490.000	QP	V	18.43	20.11	38.54	46.00	-7.47	100.00	133.00
588.000	QP	V	20.71	23.61	44.32	46.00	-1.68	100.00	149.00
196.000	QP	H	11.27	29.78	41.05	43.50	-2.46	100.00	174.00
359.800	QP	H	15.48	21.34	36.82	46.00	-9.19	100.00	133.00
490.000	QP	H	18.64	22.69	41.33	46.00	-4.67	100.00	154.00
588.000	QP	H	20.84	21.44	42.28	46.00	-3.72	100.00	169.00
686.000	QP	H	22.48	19.67	42.15	46.00	-3.85	100.00	122.00

Remark:
1.Corrected Level = Reading Level + Correction Factor
2.Correction Factor = Antenna Factor + Cable Loss

EUT : EF-6215
Worst Case : Setup 1 Tx at 107.9MHz

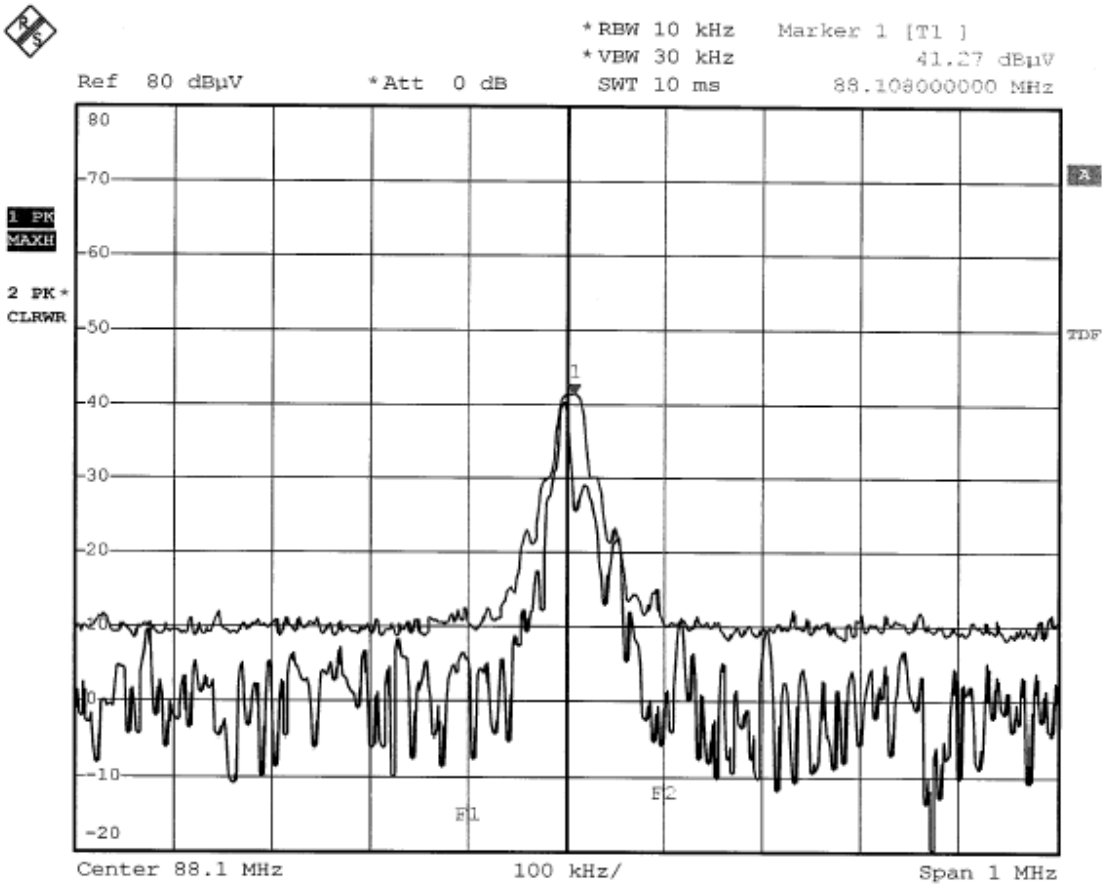
Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
215.800	QP	V	11.65	28.75	40.40	43.50	-3.10	100.00	187.00
359.800	QP	V	15.06	23.11	38.17	46.00	-7.83	100.00	166.00
431.600	QP	V	17.64	25.98	43.62	46.00	-2.38	100.00	159.00
598.420	QP	V	20.71	23.95	44.66	46.00	-1.34	100.00	136.00
679.900	QP	V	22.33	19.35	41.68	46.00	-4.33	100.00	177.00
215.800	QP	H	11.10	28.66	39.76	43.50	-3.75	100.00	158.00
359.800	QP	H	15.48	22.95	38.43	46.00	-7.58	100.00	133.00
431.600	QP	H	18.12	20.46	38.58	46.00	-7.42	100.00	161.00
598.420	QP	H	20.84	23.44	44.28	46.00	-1.72	100.00	149.00
679.900	QP	H	22.48	18.69	41.17	46.00	-4.83	100.00	155.00

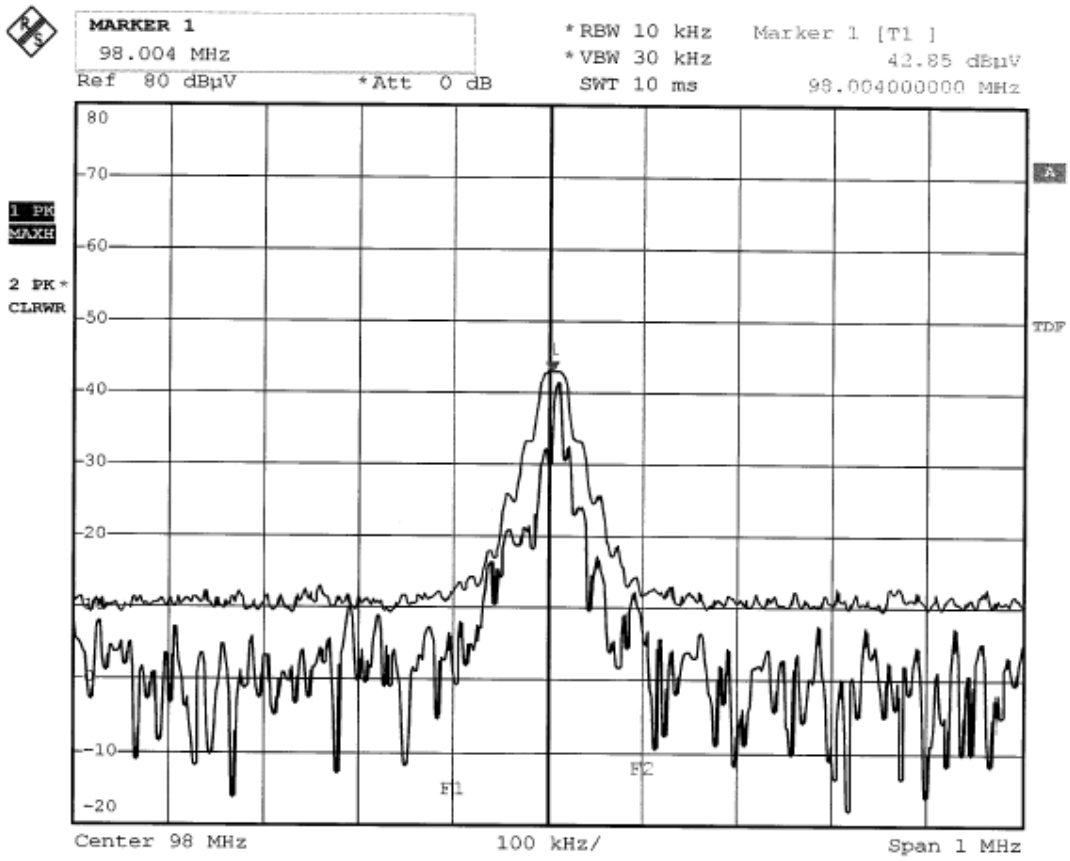
Remark:
1.Corrected Level = Reading Level + Correction Factor
2.Correction Factor = Antenna Factor + Cable Loss

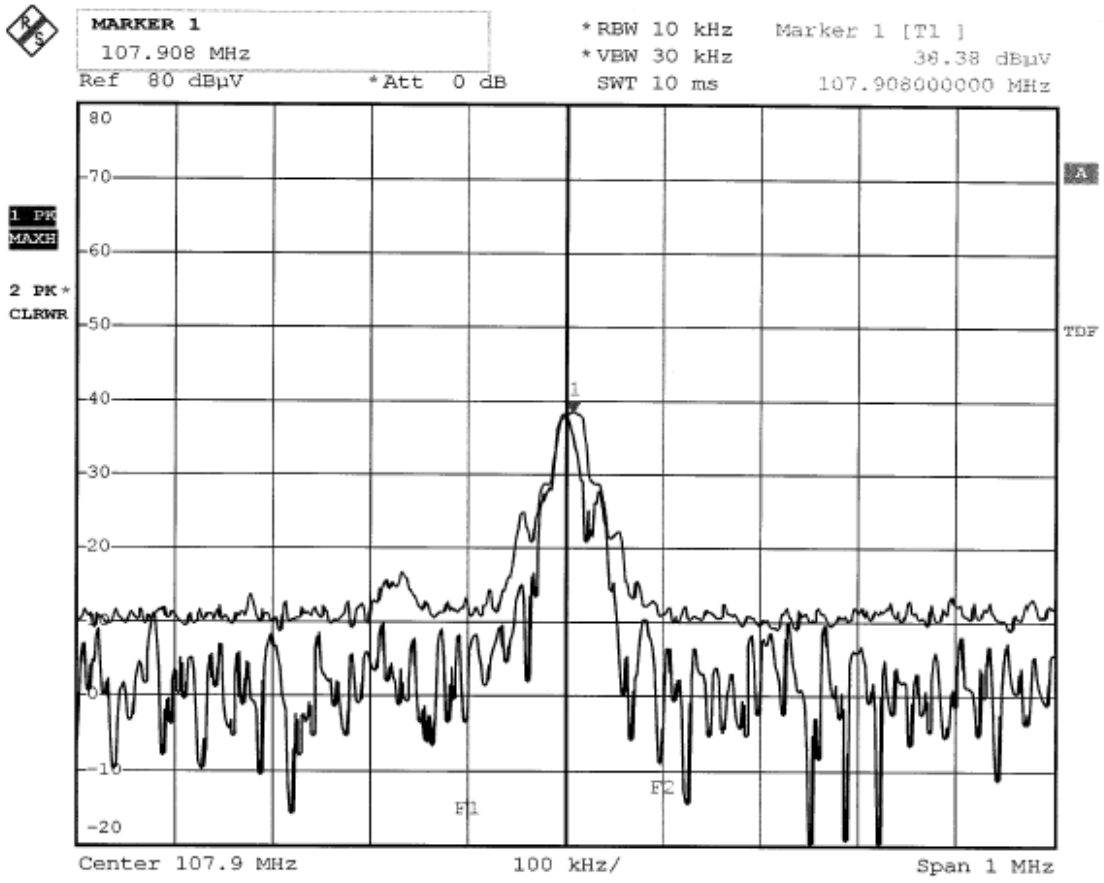
4. Bandwidth of fundamental frequency FCC 15.239(a)

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operation frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

Please see the plot below.




MARKER 1
98.004 MHz
Ref 80 dBµV
*Att 0 dB
*RBW 10 kHz
*VBW 30 kHz
SWT 10 ms
Marker 1 [T1]
42.85 dBµV
98.004000000 MHz
1 PK
MAXH
2 PK*
CLRWR
A
TDF
80
70
60
50
40
30
20
-10
-20
F1
F2
Center 98 MHz
100 kHz/
Span 1 MHz
Date: 9.AUG.2005 21:04:18



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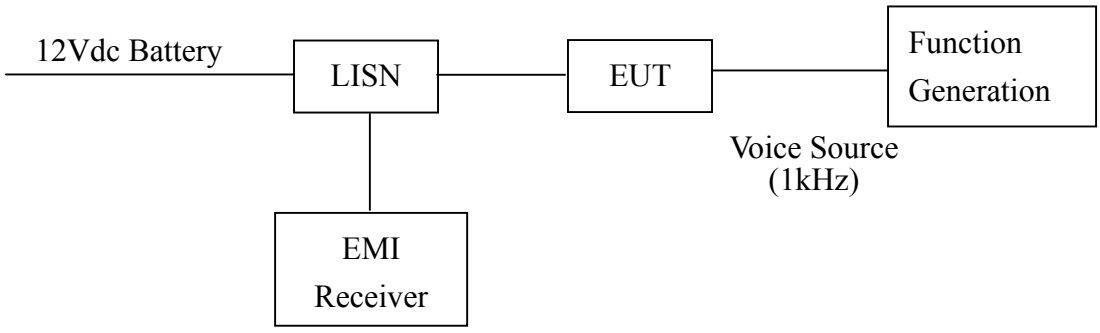
5.Power Line Conducted Emission test §FCC 15.207

5.1 Operating environment

Temperature:	25	℃
Relative Humidity:	57	%
Atmospheric Pressure	1023	hPa

5.2 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 AC power conducted emissions was invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz. (15.207 paragraph)

The EUT configuration please refer to the “Conducted set-up photo.pdf”.

Please see the plot below.

5.3 Emission limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

5.4 Uncertainty of Conducted Emission

Expanded uncertainty (k=2) of conducted emission measurement is ±2.6 dB.

5.5 Power Line Conducted Emission test data

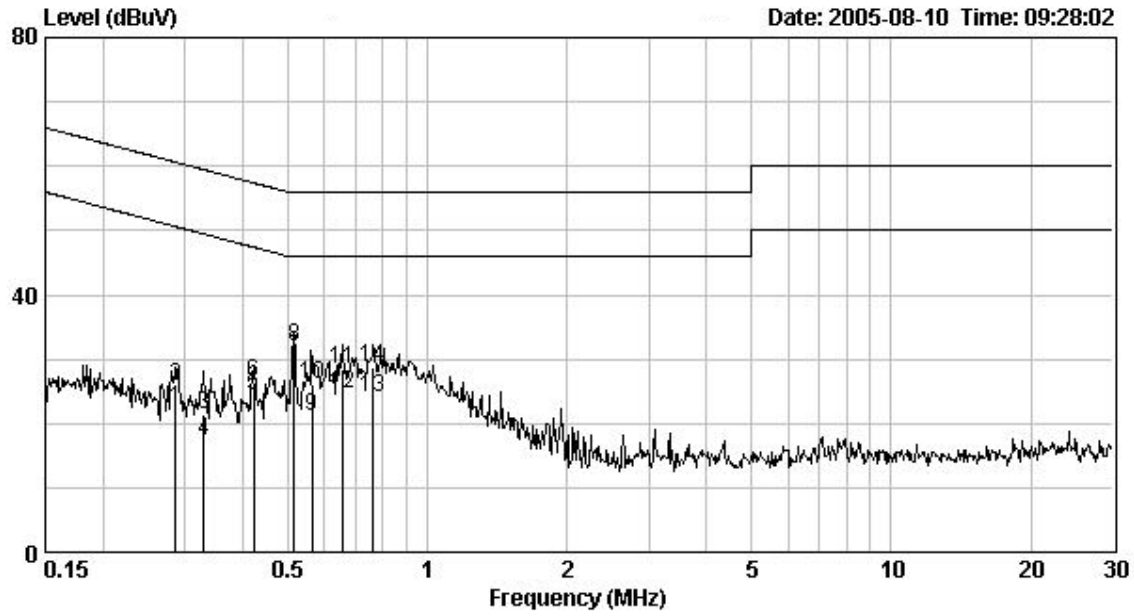
(1) Line

EUT : EF-6215

Test Condition : Tx at 88.1MHz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.286	0.03	25.67	60.63	22.30	50.63	-34.97	-28.34
0.330	0.02	21.29	59.45	17.43	49.45	-38.15	-32.01
0.423	0.03	26.39	57.40	24.38	47.40	-31.00	-23.01
0.516	0.04	31.91	56.00	30.14	46.00	-24.09	-15.86
0.563	0.05	26.05	56.00	21.06	46.00	-29.95	-24.94
0.657	0.06	28.31	56.00	24.54	46.00	-27.69	-21.46
0.766	0.06	28.66	56.00	23.92	46.00	-27.34	-22.08

Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



(2) Neutral

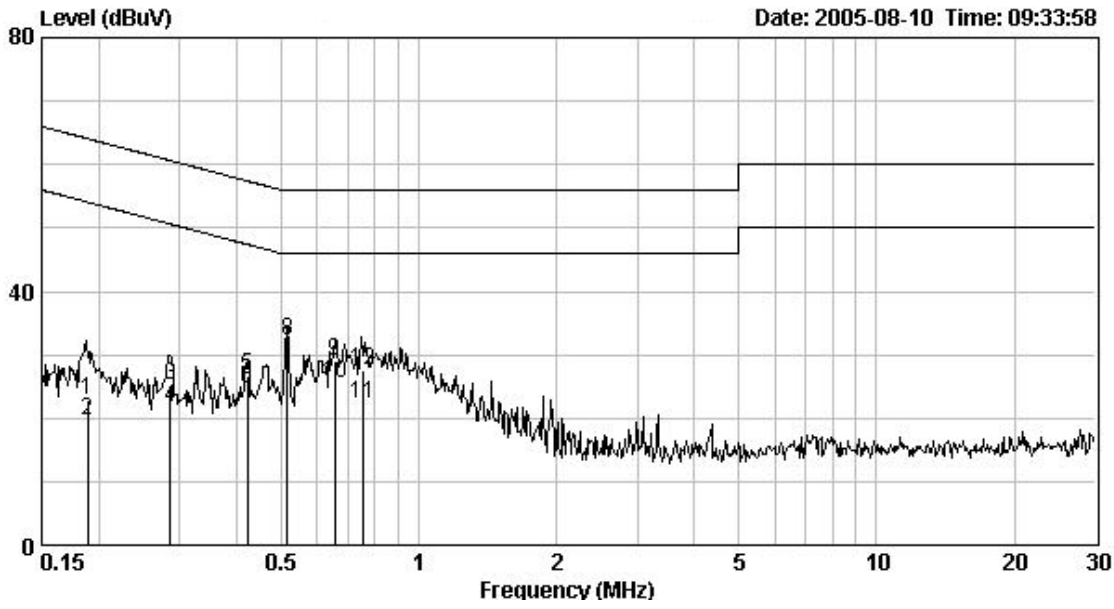
EUT : EF-6215

Test Condition : Tx at 88.1MHz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.189	0.07	22.72	64.09	19.67	54.09	-41.37	-34.42
0.286	0.04	25.14	60.64	21.63	50.64	-35.50	-29.01
0.423	0.05	26.53	57.40	24.60	47.40	-30.86	-22.79
0.516	0.06	32.36	56.00	30.69	46.00	-23.64	-15.31
0.656	0.04	29.10	56.00	25.56	46.00	-26.90	-20.44
0.752	0.04	27.57	56.00	22.14	46.00	-28.43	-23.86

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



(1) Line

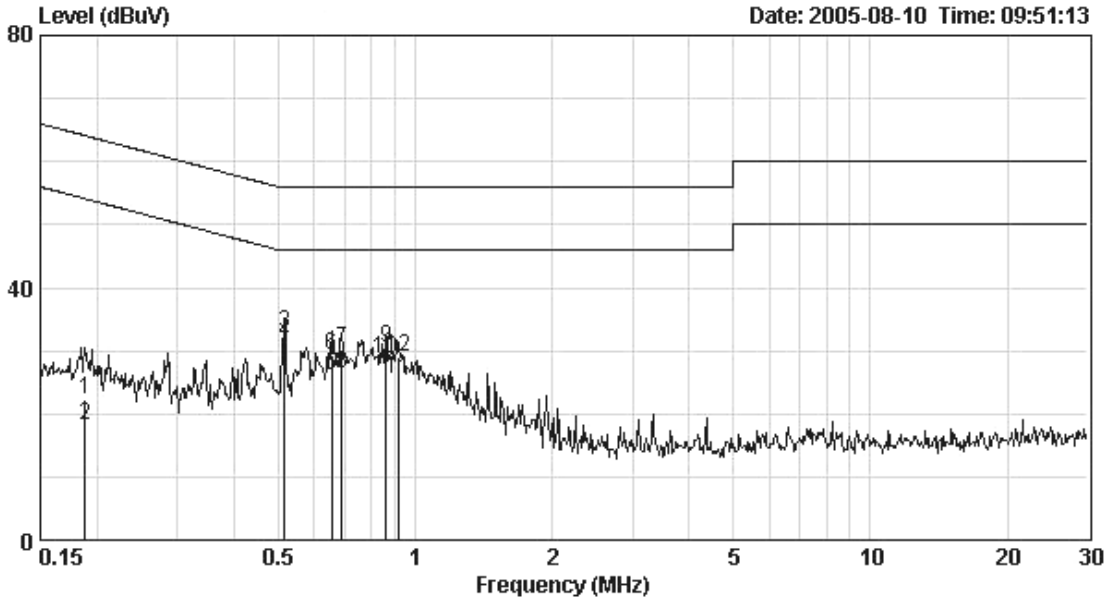
EUT : EF-6215

Test Condition : Tx at 98MHz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.188	0.07	22.18	64.13	18.29	54.13	-41.95	-35.84
0.516	0.04	32.80	56.00	31.32	46.00	-23.20	-14.68
0.655	0.06	29.40	56.00	26.21	46.00	-26.60	-19.79
0.690	0.06	30.21	56.00	26.28	46.00	-25.79	-19.72
0.863	0.05	30.57	56.00	28.61	46.00	-25.43	-17.39
0.918	0.05	28.96	56.00	25.46	46.00	-27.04	-20.54

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



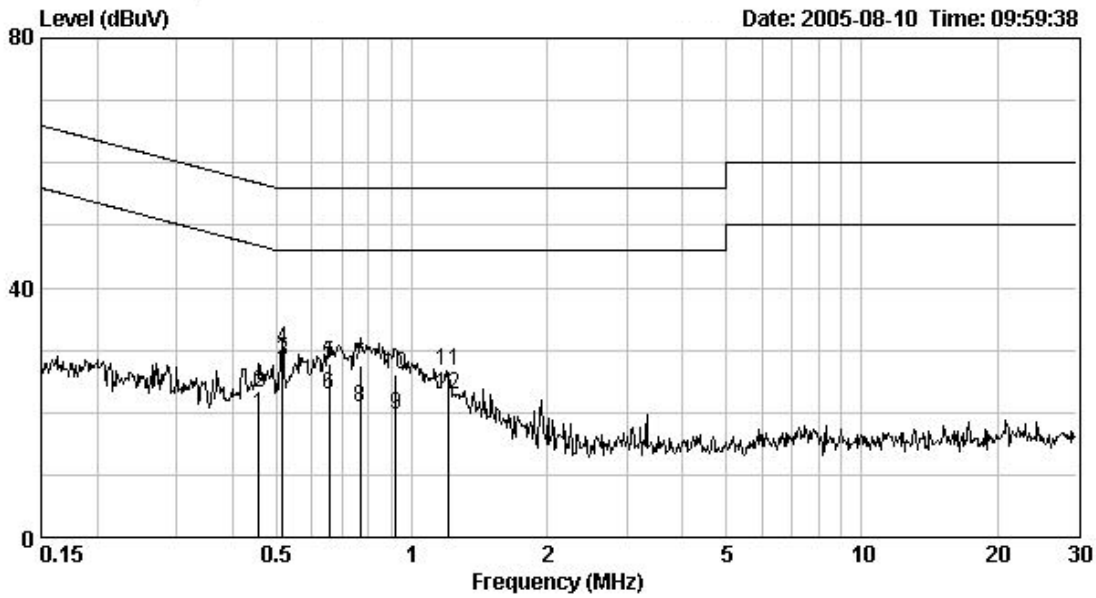
(2) Neutral

EUT : EF-6215

Test Condition : Tx at 98MHz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.458	0.06	23.16	56.73	19.64	46.73	-33.58	-27.10
0.516	0.06	30.08	56.00	28.03	46.00	-25.92	-17.97
0.655	0.04	27.87	56.00	22.89	46.00	-28.13	-23.11
0.768	0.05	27.44	56.00	20.85	46.00	-28.57	-25.16
0.923	0.06	26.10	56.00	19.55	46.00	-29.90	-26.45
1.206	0.06	26.60	56.00	22.92	46.00	-29.40	-23.08

Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



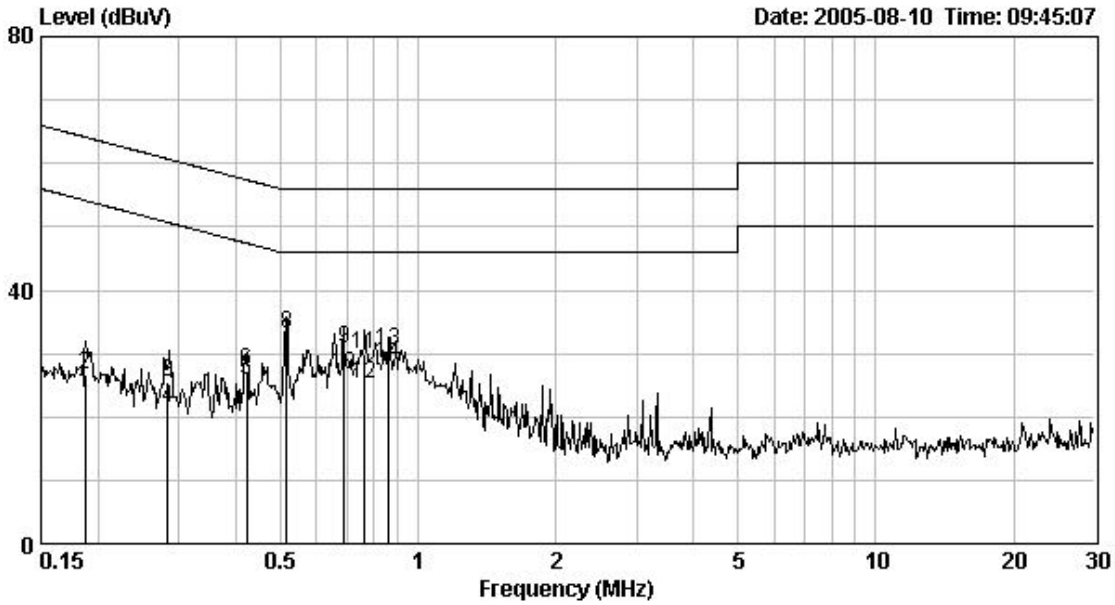
(1) Line

EUT : EF-6215

Test Condition : Tx at 107.9MHz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.187	0.07	26.54	64.15	23.84	54.15	-37.61	-30.31
0.284	0.03	25.37	60.70	21.53	50.70	-35.33	-29.17
0.423	0.03	27.35	57.40	25.73	47.40	-30.04	-21.66
0.516	0.04	33.24	56.00	31.76	46.00	-22.76	-14.24
0.689	0.06	30.79	56.00	26.55	46.00	-25.21	-19.45
0.766	0.06	29.88	56.00	25.09	46.00	-26.12	-20.91
0.864	0.05	30.41	56.00	28.40	46.00	-25.59	-17.60

Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



(2) Neutral

EUT : EF-6215

Test Condition : Tx at 107.9MHz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Margin (dB) Av
0.189	0.07	23.51	64.08	20.38	54.08	-40.57	-33.70
0.423	0.05	26.81	57.40	24.88	47.40	-30.58	-22.51
0.516	0.06	32.76	56.00	31.20	46.00	-23.24	-14.80
0.655	0.04	29.60	56.00	26.30	46.00	-26.40	-19.70
0.690	0.04	29.71	56.00	25.57	46.00	-26.29	-20.43
0.862	0.05	31.51	56.00	29.59	46.00	-24.49	-16.41

Remark:

1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)