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Report No.: GZEM130500223801

Page: 1 of 27

FCC ID: 2AAF8G100037

TEST REPORT

Application No.:	GZEM1305002238RF
Applicant:	Grooyi Toys LLC
FCC ID:	2AAF8G100037
Product Name:	Remote Control Aircraft Series
Product Description:	Wireless remote control with 2.4 GHz as carrier.
Model No.:	G100095, G100091, G100093, G100097, G100092, G100094, G100096, G100098, G140001, G140002, G140003, G140004, G140005, G140006, G140007, G140008, G140009, G140010, G140011, G140012, G140013, G140014, G140015, G140016, G100037, G130037, G130081, G130083, G130087, G130088 *
*	Please refer to section 3 of this report for details
Standards:	47 CFR PART 15 Subpart C: 2012 section 15.249
Date of Receipt:	2013-05-29
Date of Test:	2013-06-01 to 2013-06-26
Date of Issue:	2013-07-08
Test Result :	Pass*

* In the configuration tested, the EUT complied with the standards specified above.



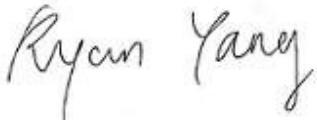
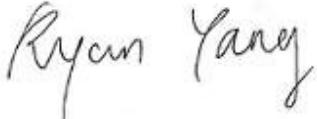
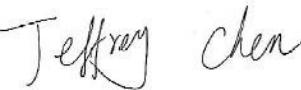
The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2013-07-08		Original

Authorized for issue by:			
Tested By	 (Ryan Yang) / Project Engineer		2013-06-01 to 2013-06-26
Prepared By	 (Ryan Yang) / Project Engineer		2013-07-01
Checked By	 (Jeffrey Chen) / Reviewer		2013-07-08

3 Test Summary

TEST	TEST REQUIREMENT	TEST METHOD	RESULT
Field Strength of Fundamental	FCC PART 15 C section 15.249 (a)	ANSI C63.10: Clause 6.6	PASS
Field Strength of Unwanted Emissions	FCC PART 15 C section 15.249 (a) section 15.249 (d)	ANSI C63.10: Clause 6.4, 6.6 and 6.7	PASS
Band Edges	FCC PART 15 C section 15.249 (d)	ANSI C63.10: Clause 6.9.2	PASS
Occupied Bandwidth	FCC PART 15 C section 15.215(c)	ANSI C63.10: Clause 6.9.1	PASS

Remark:

EUT: In this whole report EUT means Equipment Under Test.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radio Frequency.

ANSI C63.10: the detail version is ANSI C63.10:2009 in the whole report.

♣Model No.: **G100095**, G100091, G100093, G100097, G100092, G100094, G100096, G100098, G140001, G140002, G140003, G140004, G140005, G140006, G140007, G140008, G140009, G140010, G140011, G140012, G140013, G140014, G140015, G140016, G100037, G130037, G130081, G130083, G130087, G130088

According to the confirmation from the applicant, since the electrical circuit design, layout, components used and internal wiring were identical for the above items, only difference being the item numbers.

Therefore only one item **G100095** was tested in this report.

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5 General Information

5.1 Client Information

Applicant: Grooyi Toys LLC
Address of Applicant: 563 Mercantile Place Port ST Lucie, FL 34986 United States

5.2 General Description of E.U.T.

Product Name: Remote Control Aircraft Series
Model No.: G100095

5.3 Details of E.U.T.

Operating Frequency 2405 MHz to 2470 MHz
Type of Modulation: GFSK
Number of Channels 66
Channel Separation: 1 MHz
Antenna Type Integral Antenna
Antenna gain: 2.0 dBi
Function: The EUT is a set of equipment with FHSS technology; the EUT will hop between 2405 MHz and 2470 MHz with 66 channels to transfer data.
Power Supply: DC 6.0 V size "AAA" batteries x 4 for Tx.
Power cord: N/A

5.4 Description of Support Units

None.

5.5 Other Information Requested by the Customer

None.

5.6 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

5.7 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **FCC (Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

- **Industry Canada (Registration No.: 4620B-1)**

The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

- **VCCI (Registration No.: R-2460, C-2584, G-449 and T-1179)**

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2460, C-2584, G-449 and T-1179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01:2006-10 and Rules of procedure IECEE 02:2006-10, and the relevant IECEE CB-Scheme Operational documents.

6 Equipment Used during Test

RE in Chamber						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date	Calibration Interval
					(YYYY-MM-DD)	
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2014-08-30	2Y
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2014-05-06	1Y
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	100236	2014-03-04	1Y
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2014-05-09	1Y
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9163	9163-450	2013-12-17	2Y
EMC0524	Bi-Log Type Antenna	Schaffner -Chase	CBL6112B	2966	2013-11-27	2Y
EMC0519	BiLog Type Antenna	Schaffner -Chase	CBL6143	5070	2014-06-02	2Y
EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2013-11-28	2Y
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2014-07-01	2Y
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2014-03-04	1Y
EMC2065	Amplifier	HP	8447F	N/A	2013-11-7	1Y
EMC2063	1-26GHz Pre Amplifier	Compliance Direction System Inc.	PAP-1G26-48	6279.628	2013-07-29	1Y
EMC0075	310N Amplifier	Sonoma	310N	272683	2014-03-04	1Y
EMC0523	Active Loop Antenna	EMCO	6502	42963	2014-04-07	2Y
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONI	BBHA 9170	9170-375	2014-06-01	3Y
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2014-04-27	2Y

General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date	Calibration Interval
					(YYYY-MM-DD)	
EMC0006	DMM	Fluke	73	70681569	2013-11-5	1Y
EMC0007	DMM	Fluke	73	70671122	2013-11-5	1Y

7 Test Results

7.1 E.U.T. Operation

Test Voltage:	DC 6.0V by "AAA" batteries x 4
Temperature:	20.0 -25.0 °C
Humidity:	38-50 % RH
Atmospheric Pressure:	1000 -1010 mbar
Test frequencies and frequency range:	According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table: According to the 15.33 (a) For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2405	22	2427	44	2449
1	2406	23	2428	45	2450
2	2407	24	2429	46	2451
3	2408	25	2430	47	2452
4	2409	26	2431	48	2453
5	2410	27	2432	49	2454
6	2411	28	2433	50	2455
7	2412	29	2434	51	2456
8	2413	30	2435	52	2457
9	2414	31	2436	53	2458
10	2415	32	2437	54	2459
11	2416	33	2438	55	2460
12	2417	34	2439	56	2461
13	2418	35	2440	57	2462
14	2419	36	2441	58	2463
15	2420	37	2442	59	2464
16	2421	38	2443	60	2465
17	2422	39	2444	61	2466
18	2423	40	2445	62	2467
19	2424	41	2446	63	2468
20	2425	42	2447	64	2469
21	2426	43	2448	65	2470

Test frequencies are the lowest channel: 0 channel(2405 MHz), middle channel: 31 channel(2436 MHz) and highest channel: 65 channel(2470 MHz)

7.2 Antenna Requirement

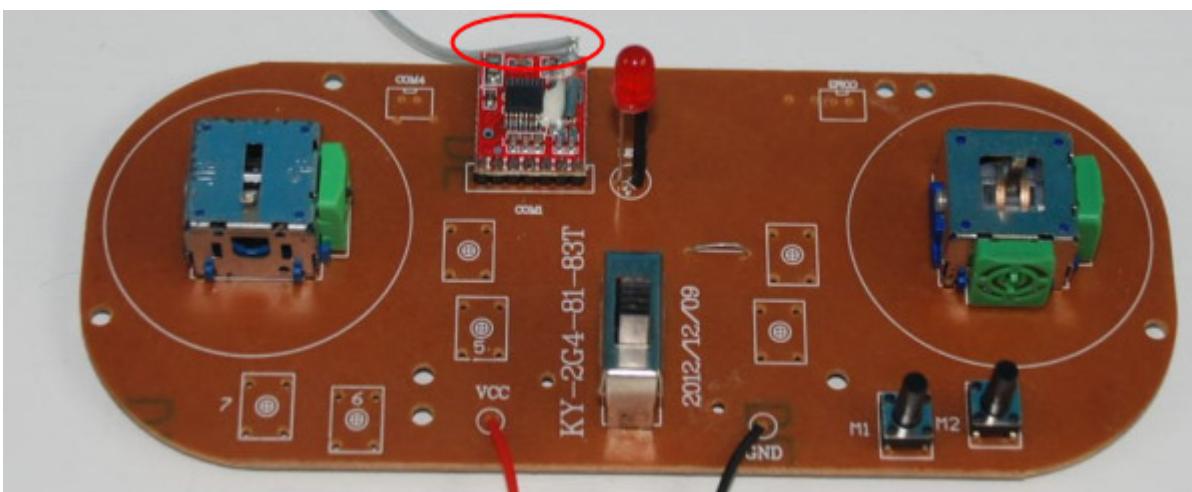
Standard requirement

15.203 requirement:

For intentional device. According to 15.203. an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

EUT Antenna

The antenna is an integrated antenna on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.0 dBi.



Test result: The unit does meet the FCC requirements.

7.3 Field Strength of Fundamental& Field Strength of Unwanted Emissions& Band Edge

Test Requirement: FCC Part15 C section 15.249

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dB μ V/m @ 3m)	Field Strength of Harmonics (dB μ V/m @ 3m)
902 to 928	94.0	54.0
2400 to 2483.5	94.0	54.0
5725 to 5875	94.0	54.0
24000 to 24250	108.0	68.0

(d) 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 or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Limits: The fundamental frequency range is in the frequency band of the EUT is 2405MHz ~ 2470MHz.

The limit for Average field strength dB μ V/m for the fundamental frequency = 94.0 dB μ V/m.

The limit for Peak field strength dB μ V/m for the fundamental frequency = 114.0 dB μ V/m.

No fundamental is allowed in the restricted bands.

The limit for average field strength dB μ V/m for the harmonics = 54.0 dB μ V/m.

The limit for peak field strength dB μ V/m for the harmonics = 74.0 dB μ V/m.

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 54.0 dB μ V/m in 15.209. Here the limit for the other emission is 54.0 dB μ V/m.

Test Method: ANSI C63.10: Clause 6.4, 6.6 and 6.7 for Field Strength of Fundamental& Field Strength of Unwanted Emissions

ANSI C63.10: Clause 6.9.2 for Band Edge

Status Pre-test the EUT in continuous transmitting mode with setup as stand-alone in X, Y, Z three axes, found the worst case is X axes and report the data.

Measurement Distance: 3m (Semi-Anechoic Chamber)

Frequency range 9 kHz – 25 GHz for transmitting mode.

Test instrumentation resolution bandwidth

9 kHz (9 kHz - 30 MHz), 120 kHz (30 MHz - 1000 MHz), 1 MHz (1000 MHz – 25 GHz)

Test Procedure:

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.10. The centre of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

For testing performed with the bi-log type antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

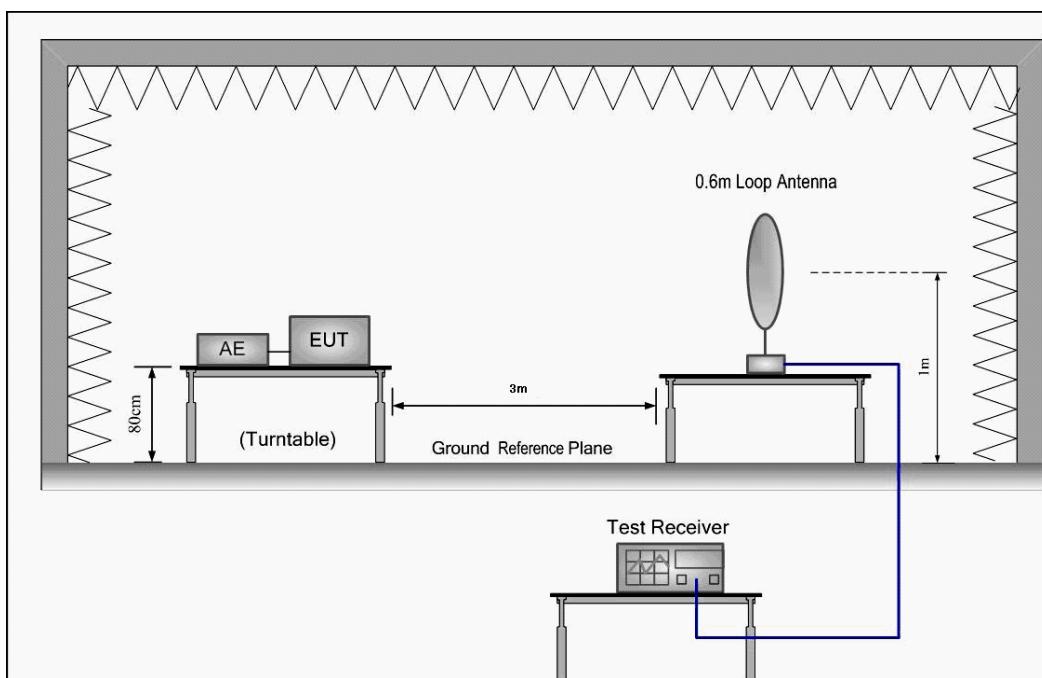
3) 1 GHz to 25 GHz emissions:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2007 was used to perform radiated emission test above 1 GHz.

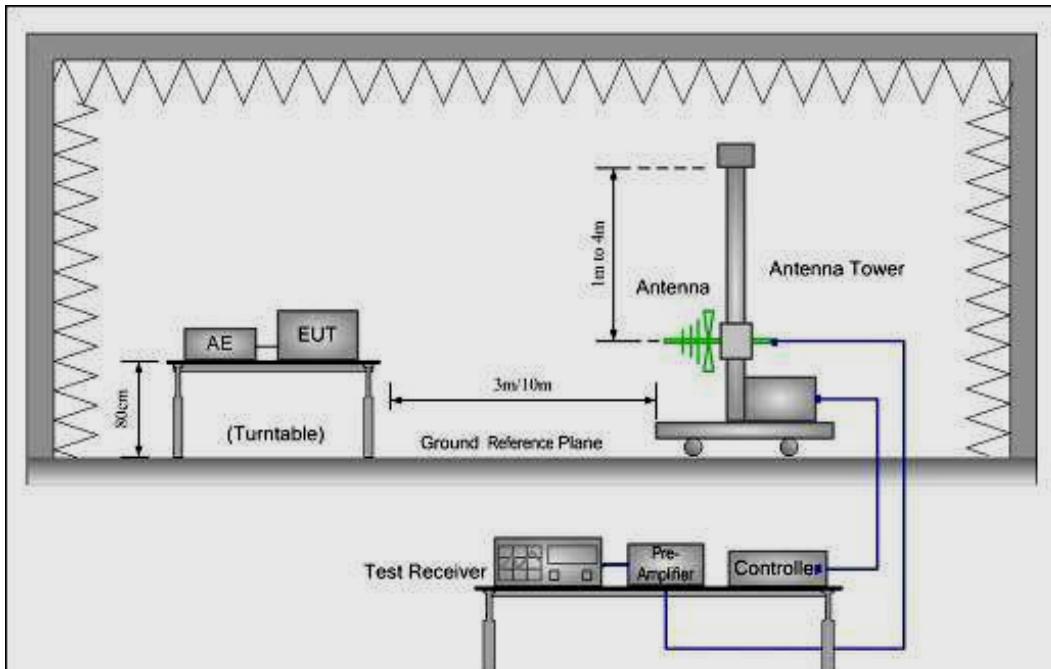
For testing performed with the horn antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360°, the antenna height scan between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

Test Configuration:

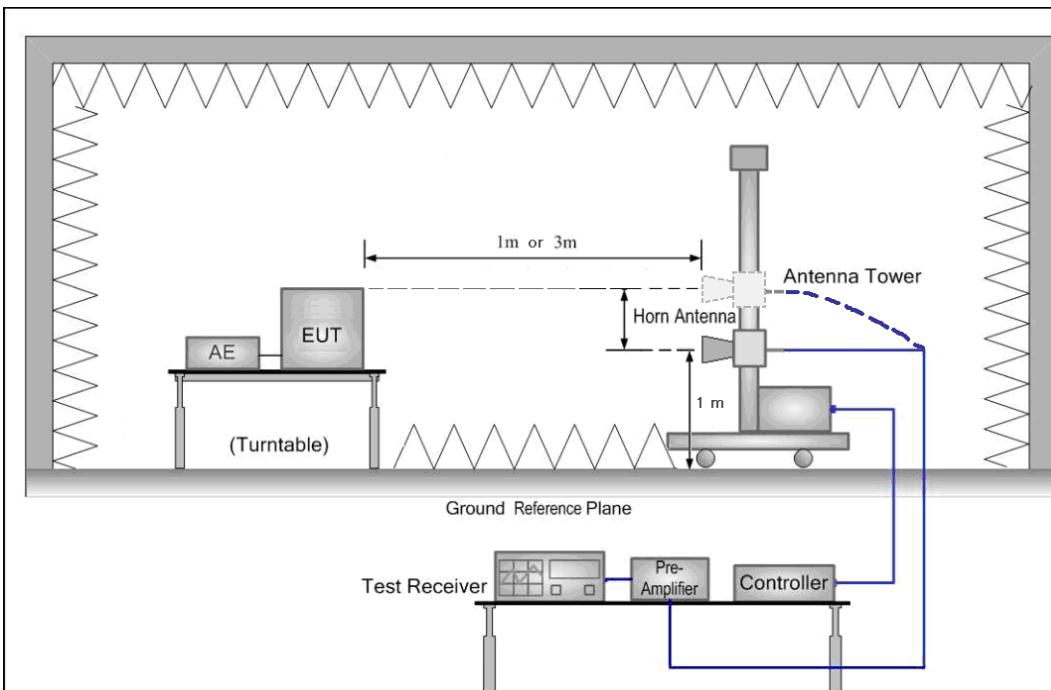
1) 9 kHz to 30 MHz emissions:



2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 25 GHz emissions:



The field strength is calculated by adding the Antenna Factor, Cable Loss & Per-amplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Loss – Preamplifier Factor

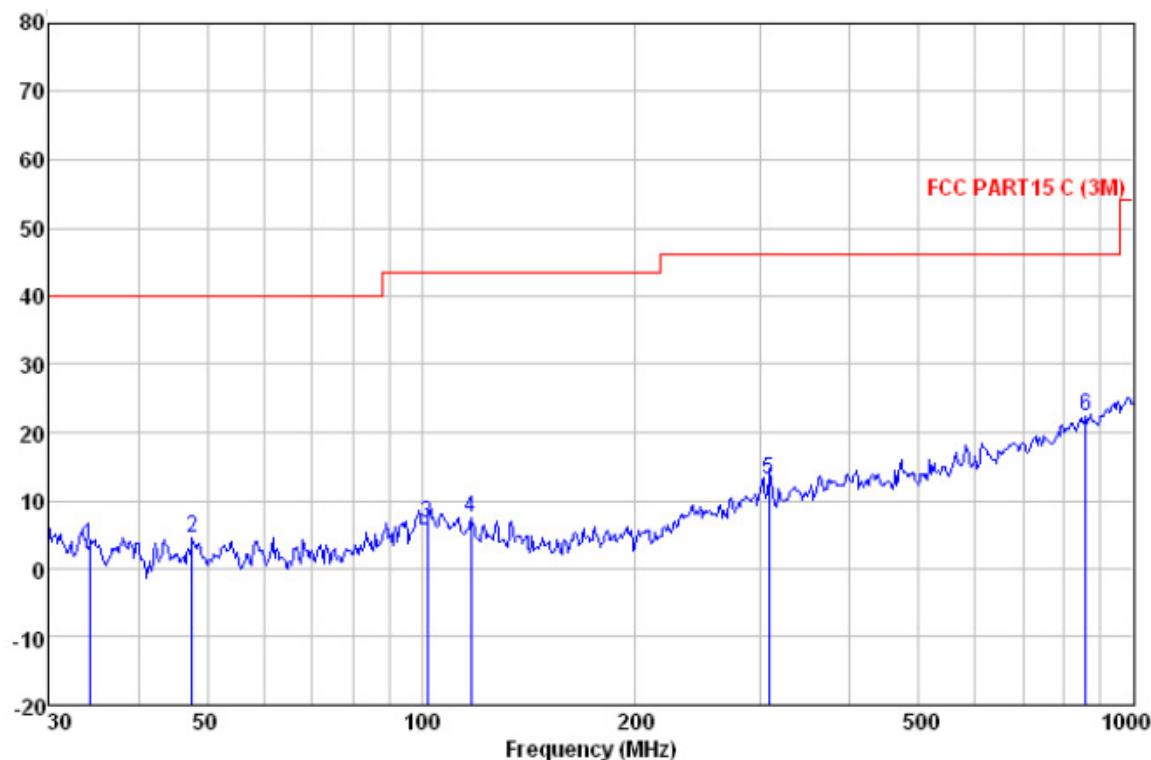
Test at low Channel in transmitting status**9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement**

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30 MHz~1 GHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

Vertical:

Peak scan

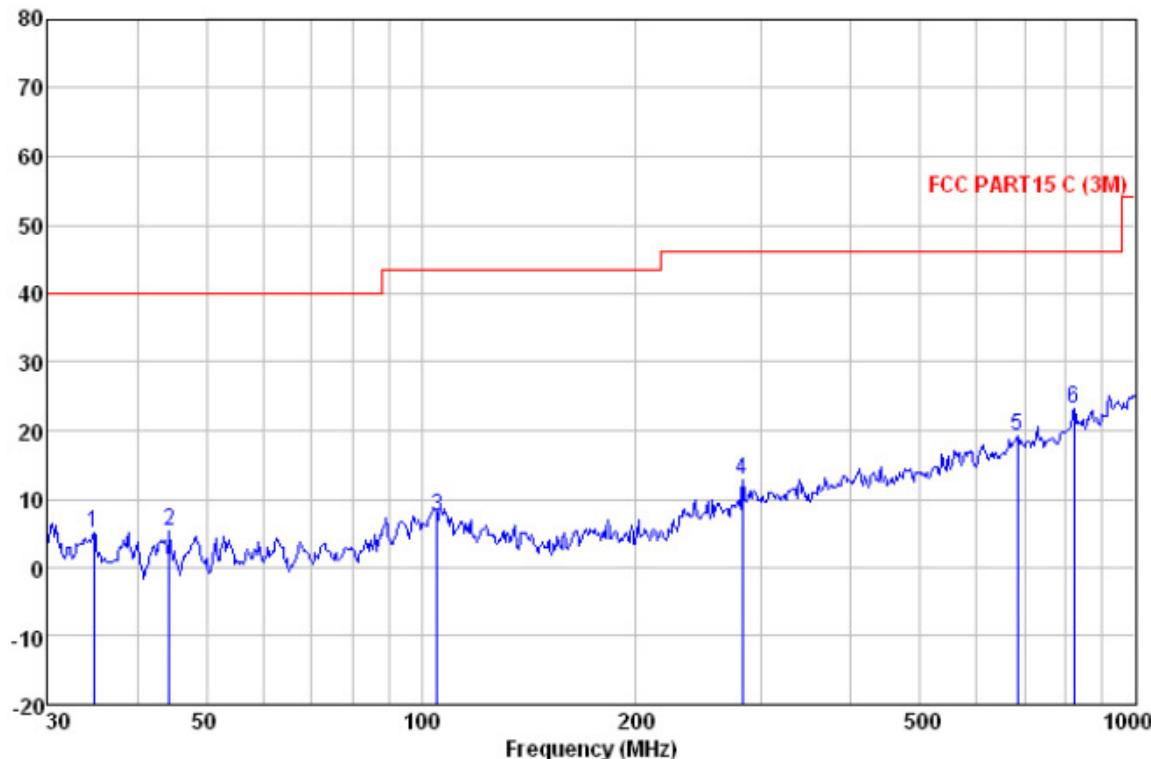
Level (dB μ V/m)

Quasi-peak measurement

Freq	Read		Antenna		Cable		Preamp	Limit	Over	Limit	Remark
	Level	Factor	Loss	Factor	Level	Line					
MHz	dB μ V	dB/m	dB	dB	dB μ V/m	dB μ V/m	dB				
34.156	24.50	9.79	0.88	31.60	3.57	40.00	-36.43	QP			
47.659	26.12	9.04	0.98	31.60	4.54	40.00	-35.46	QP			
102.001	24.70	12.11	1.44	31.59	6.66	43.50	-36.84	QP			
117.360	27.40	10.05	1.54	31.55	7.44	43.50	-36.06	QP			
307.831	28.77	13.31	2.38	31.28	13.18	46.00	-32.82	QP			
857.025	28.90	20.60	4.00	31.14	22.36	46.00	-23.64	QP			

Horizontal:

Peak scan

Level (dB μ V/m)

Quasi-peak measurement

Freq MHz	Read Level dB μ V	Antenna Factor dB/m	Cable Loss Factor dB		Preamp Level dB	Limit Line dB μ V/m	Over Line dB μ V/m	Over Limit dB	Over Remark
34.760	26.20	9.70	0.88		31.60	5.18	40.00	-34.82	QP
44.431	26.80	9.05	0.96		31.60	5.21	40.00	-34.79	QP
105.272	25.36	12.35	1.47		31.59	7.59	43.50	-35.91	QP
281.995	29.11	12.60	2.28		31.30	12.69	46.00	-33.31	QP
684.745	28.38	18.40	3.51		31.21	19.08	46.00	-26.92	QP
821.710	29.71	20.78	3.94		31.18	23.25	46.00	-22.75	QP

1~25 GHz Field Strength of Fundamental & Field Strength of Unwanted Emissions.

Peak & Average Measurement

Peak Measurement:							
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2405.00	27.58	6.60	49.44	105.43	90.17	114.00	V
4810.00	31.53	11.11	49.30	69.15	62.49	74.00	V
7215.00	36.47	12.96	49.69	69.88	69.62	74.00	V
9620.00	38.08	15.16	49.88	57.55	60.91	74.00	V
2405.00	27.58	6.60	49.44	105.21	89.95	114.00	H
4810.00	31.53	11.11	49.30	63.43	56.77	74.00	H
7215.00	36.47	12.96	49.69	61.90	61.64	74.00	H
9620.00	38.08	15.16	49.88	56.57	59.93	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2405.00	27.58	6.60	49.44	88.43	73.17	94.00	V
4810.00	31.53	11.11	49.30	50.15	43.49	54.00	V
7215.00	36.47	12.96	49.69	46.88	46.62	54.00	V
9620.00	38.08	15.16	49.88	41.55	44.91	54.00	V
2405.00	27.58	6.60	49.44	92.21	76.95	94.00	H
4810.00	31.53	11.11	49.30	50.43	43.77	54.00	H
7215.00	36.47	12.96	49.69	46.90	46.64	54.00	H
9620.00	38.08	15.16	49.88	42.57	45.93	54.00	H

Band Edge:

Peak Measurement:							
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2400.00	27.58	6.56	49.44	58.93	43.63	74.00	V
2483.50	27.55	6.99	49.42	56.46	41.58	74.00	V
2400.00	27.58	6.56	49.44	58.19	42.89	74.00	H
2483.50	27.55	6.99	49.42	58.10	43.22	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2400.00	27.58	6.56	49.44	46.93	31.63	54.00	V
2483.50	27.55	6.99	49.42	46.46	31.58	54.00	V
2400.00	27.58	6.56	49.44	48.19	32.89	54.00	H
2483.50	27.55	6.99	49.42	49.10	34.22	54.00	H

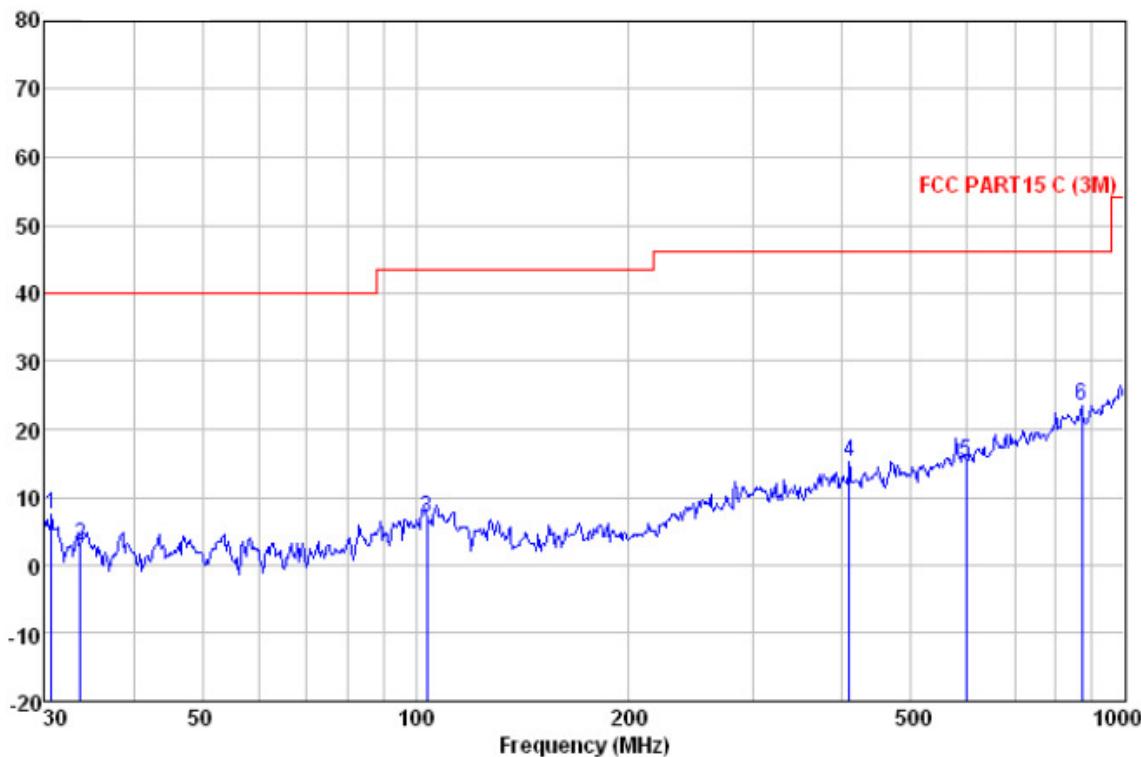
Test at middle Channel in transmitting status**9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement**

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30 MHz~1 GHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

Vertical:

Peak scan

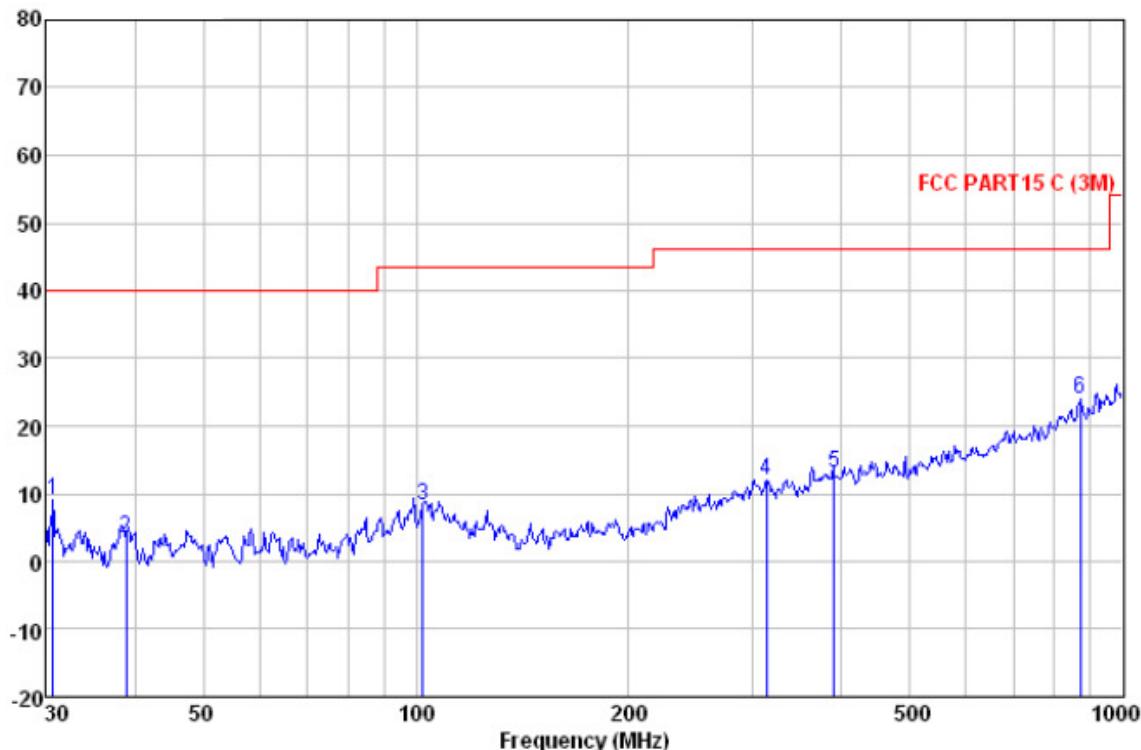
Level (dB μ V/m)

Quasi-peak measurement

Freq	Read Antenna		Cable		Preamp	Limit	Over	Over
	Level	Factor	Loss	Factor				
MHz	dB μ V	dB/m	dB	dB	dB μ V/m	dB μ V/m	dB	
30.638	27.85	10.48	0.84	31.60	7.57	40.00	-32.43	QP
33.680	23.72	9.85	0.87	31.60	2.84	40.00	-37.16	QP
103.806	24.68	12.31	1.46	31.59	6.86	43.50	-36.64	QP
408.946	28.53	14.93	2.75	31.11	15.10	46.00	-30.90	QP
597.223	26.69	16.65	3.27	31.30	15.31	46.00	-30.69	QP
869.130	28.66	22.00	4.05	31.13	23.58	46.00	-22.42	QP

Horizontal:

Peak scan

Level (dB μ V/m)

Quasi-peak measurement

Freq MHz	Read	Antenna	Cable	Preamp	Limit Line dB	Over Limit dB	Remark
	Level Factor	Loss Factor	Level dB	dB dBuV/m			
30.638	29.24	10.48	0.84	31.60	8.96	40.00	-31.04 QP
38.888	25.15	9.10	0.92	31.60	3.57	40.00	-36.43 QP
102.360	26.21	12.15	1.45	31.59	8.22	43.50	-35.28 QP
313.276	27.68	13.22	2.41	31.27	12.04	46.00	-33.96 QP
390.723	27.55	14.04	2.68	31.11	13.16	46.00	-32.84 QP
869.130	29.06	22.00	4.05	31.13	23.98	46.00	-22.02 QP

1~25 GHz Field Strength of Fundamental & Field Strength of Unwanted Emissions.

Peak & Average Measurement

Peak Measurement:							
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2436.00	27.57	6.77	49.43	108.77	93.68	114.00	V
4872.00	31.57	11.24	49.30	69.50	63.01	74.00	V
7308.00	36.49	13.22	49.70	65.75	65.76	74.00	V
9744.00	38.46	15.05	49.89	56.76	60.38	74.00	V
2436.00	27.57	6.77	49.43	103.11	88.02	114.00	H
4872.00	31.57	11.24	49.30	61.28	54.79	74.00	H
7308.00	36.49	13.22	49.70	62.82	62.83	74.00	H
9744.00	38.46	15.05	49.89	57.04	60.66	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2436.00	27.57	6.77	49.43	88.77	73.68	94.00	V
4872.00	31.57	11.24	49.30	49.50	43.01	54.00	V
7308.00	36.49	13.22	49.70	41.75	41.76	54.00	V
9744.00	38.46	15.05	49.89	42.76	46.38	54.00	V
2436.00	27.57	6.77	49.43	89.11	74.02	94.00	H
4872.00	31.57	11.24	49.30	45.28	38.79	54.00	H
7308.00	36.49	13.22	49.70	44.82	44.83	54.00	H
9744.00	38.46	15.05	49.89	42.04	45.66	54.00	H

Band Edge:

Peak Measurement:							
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2400.00	27.58	6.56	49.44	62.28	46.98	74.00	V
2483.50	27.55	6.99	49.42	65.08	50.20	74.00	V
2400.00	27.58	6.56	49.44	57.32	42.02	74.00	H
2483.50	27.55	6.99	49.42	57.66	42.78	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2400.00	27.58	6.56	49.44	51.28	35.98	54.00	V
2483.50	27.55	6.99	49.42	51.08	36.20	54.00	V
2400.00	27.58	6.56	49.44	50.32	35.02	54.00	H
2483.50	27.55	6.99	49.42	51.66	36.78	54.00	H

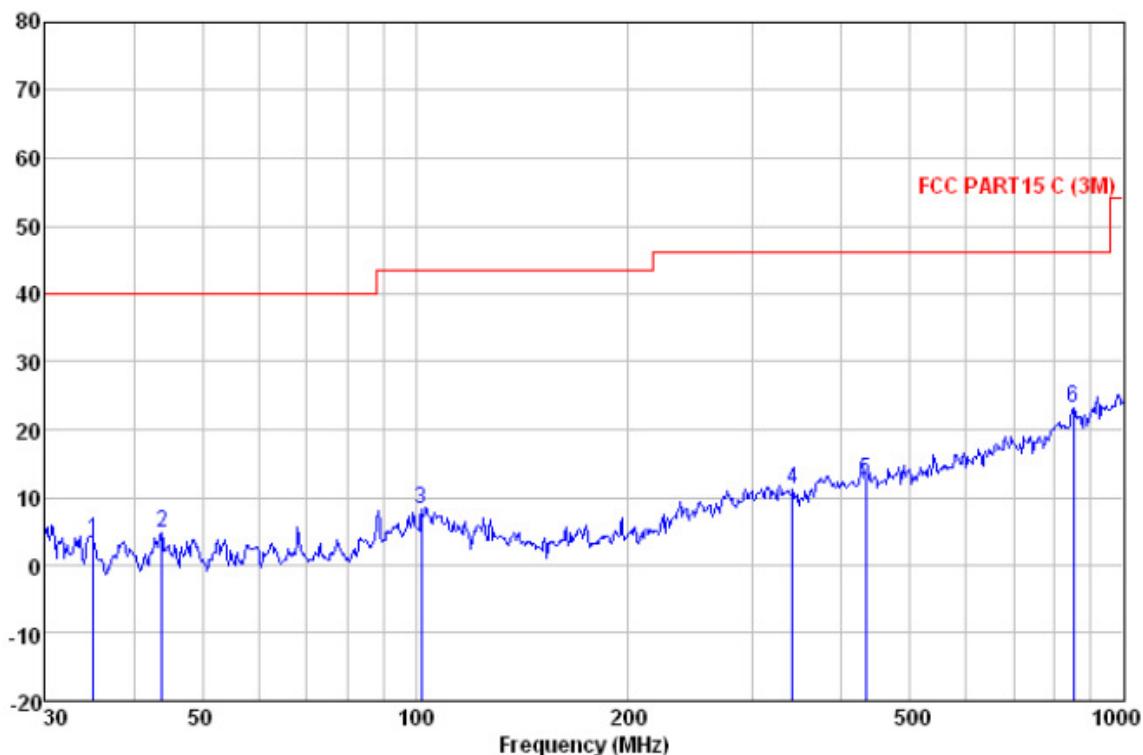
Test at high Channel in transmitting status**9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement**

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30 MHz~1 GHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement

Vertical:

Peak scan

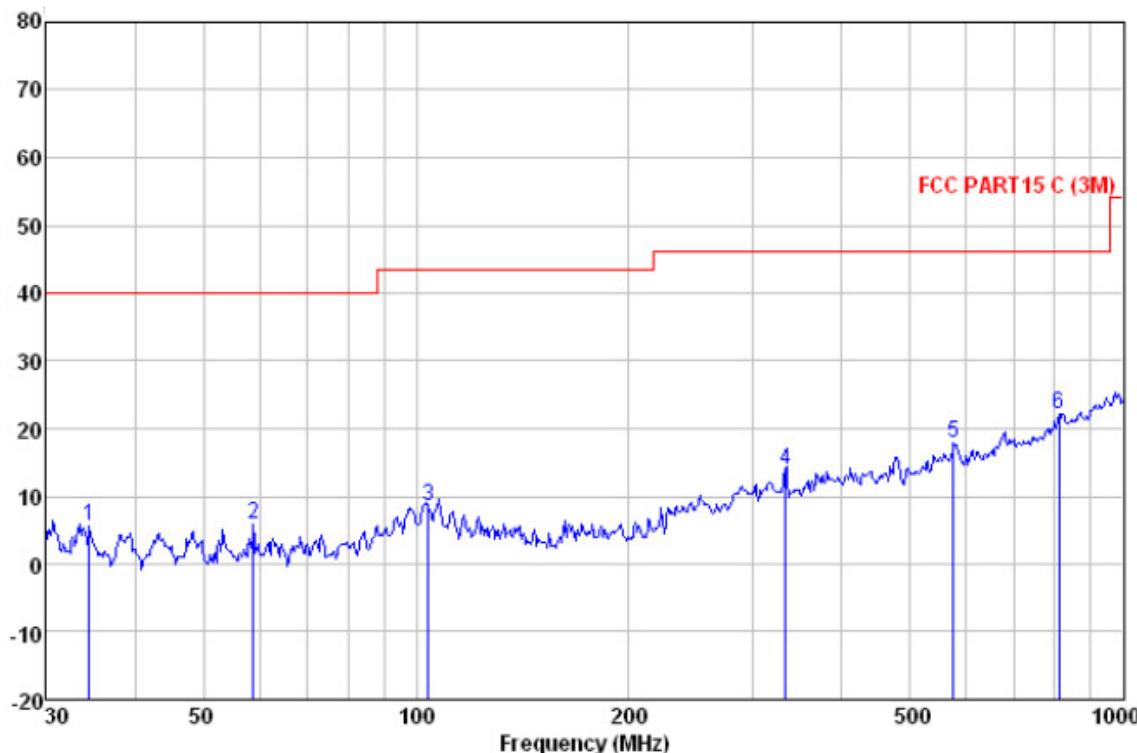
Level (dB μ V/m)

Quasi-peak measurement

Freq	Read Antenna		Cable		Preamp	Limit	Over	Over
	Level	Factor	Loss	Factor				
MHz	dB μ V	dB/m	dB	dB	dB μ V/m	dB μ V/m	dB	
35.128	24.75	9.63	0.88	31.60	3.66	40.00	-36.34	QP
43.812	26.46	8.97	0.96	31.60	4.79	40.00	-35.21	QP
102.001	26.22	12.11	1.44	31.59	8.18	43.50	-35.32	QP
340.782	26.65	13.13	2.52	31.21	11.09	46.00	-34.91	QP
432.546	25.93	14.87	2.86	31.14	12.52	46.00	-33.48	QP
851.035	29.39	21.00	3.97	31.15	23.21	46.00	-22.79	QP

Horizontal:

Peak scan

Level (dB μ V/m)

Quasi-peak measurement

Freq	Read		Antenna		Cable		Preamp		Limit	Over	Line	Over	Remark
	Level	Factor	Loss	Factor	Level	dB	dBuV/m	dBuV/m					
MHz	dB μ V	dB/m		dB		dB	dB μ V/m	dB μ V/m					
34.517	26.64	9.74	0.88	31.60	5.66	40.00	-34.34	QP					
58.819	28.13	8.34	1.11	31.60	5.98	40.00	-34.02	QP					
104.170	26.29	12.34	1.46	31.59	8.50	43.50	-35.00	QP					
332.519	29.20	13.35	2.49	31.23	13.81	46.00	-32.19	QP					
574.626	28.94	16.90	3.18	31.28	17.74	46.00	-28.26	QP					
810.265	29.00	20.30	3.92	31.19	22.03	46.00	-23.97	QP					

1~25 GHz Field Strength of Fundamental & Field Strength of Unwanted Emissions.**Peak & Average Measurement**

Peak Measurement:							
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2470.00	27.56	6.95	49.42	105.37	90.46	114.00	V
4940.00	31.68	11.37	49.30	72.22	65.97	74.00	V
7410.00	36.57	13.54	49.72	65.40	65.79	74.00	V
9880.00	38.66	14.96	49.89	59.75	63.48	74.00	V
2470.00	27.56	6.95	49.42	105.05	90.14	114.00	H
4940.00	31.68	11.37	49.30	66.52	60.27	74.00	H
7410.00	36.57	13.54	49.72	63.37	63.76	74.00	H
9880.00	38.66	14.96	49.89	56.70	60.43	74.00	H

Average Measurement:							
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2470.00	27.56	6.95	49.42	89.37	74.46	94.00	V
4940.00	31.68	11.37	49.30	47.22	40.97	54.00	V
7410.00	36.57	13.54	49.72	42.40	42.79	54.00	V
9880.00	38.66	14.96	49.89	41.75	45.48	54.00	V
2470.00	27.56	6.95	49.42	89.05	74.14	94.00	H
4940.00	31.68	11.37	49.30	47.52	41.27	54.00	H
7410.00	36.57	13.54	49.72	41.37	41.76	54.00	H
9880.00	38.66	14.96	49.89	40.70	44.43	54.00	H

Band Edge:

Peak Measurement:							
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2400.00	27.58	6.56	49.44	60.50	45.20	74.00	V
2483.50	27.55	6.99	49.42	56.40	41.52	74.00	V
2400.00	27.58	6.56	49.44	58.48	43.18	74.00	H
2483.50	27.55	6.99	49.42	55.75	40.87	74.00	H

Average Measurement:

Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2400.00	27.58	6.56	49.44	49.50	34.20	54.00	V
2483.50	27.55	6.99	49.42	48.40	33.52	54.00	V
2400.00	27.58	6.56	49.44	45.48	30.18	54.00	H
2483.50	27.55	6.99	49.42	46.75	31.87	54.00	H

Remark:

- 1). The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Loss –Preamplifier Factor.

- 2). As shown in Section, for frequencies above 1000 MHz. the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
- 3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.
- 4).It works continuously transmitter (100% duty cycle)

Test result: The unit does meet the FCC requirements.

7.4 Occupied Bandwidth

Test Requirement: FCC Part 15 C section 15.249

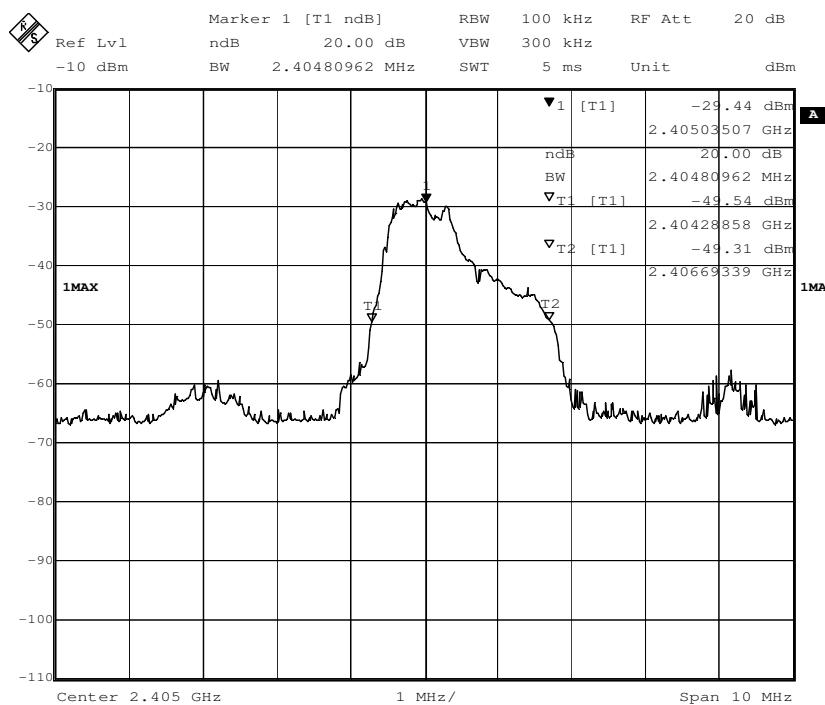
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

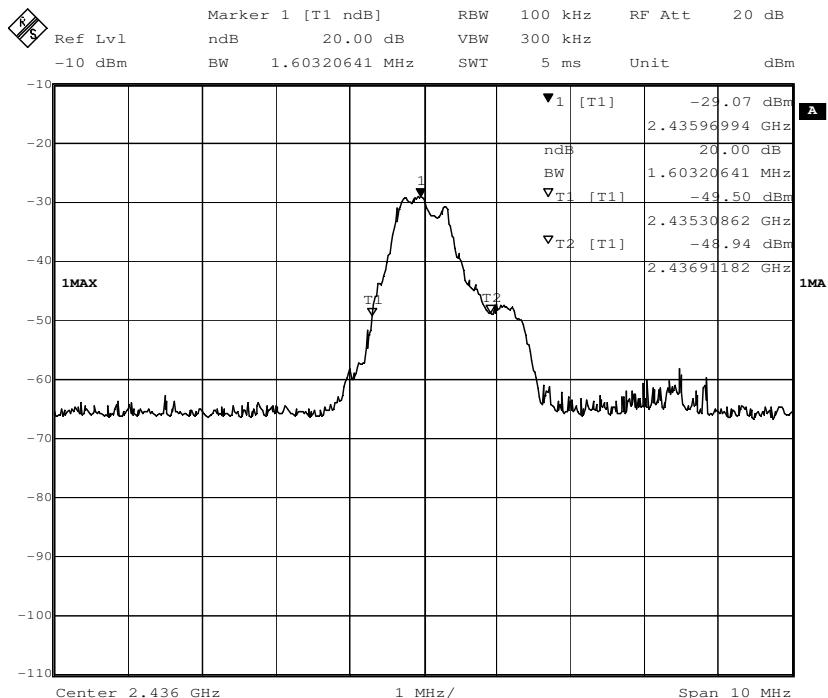
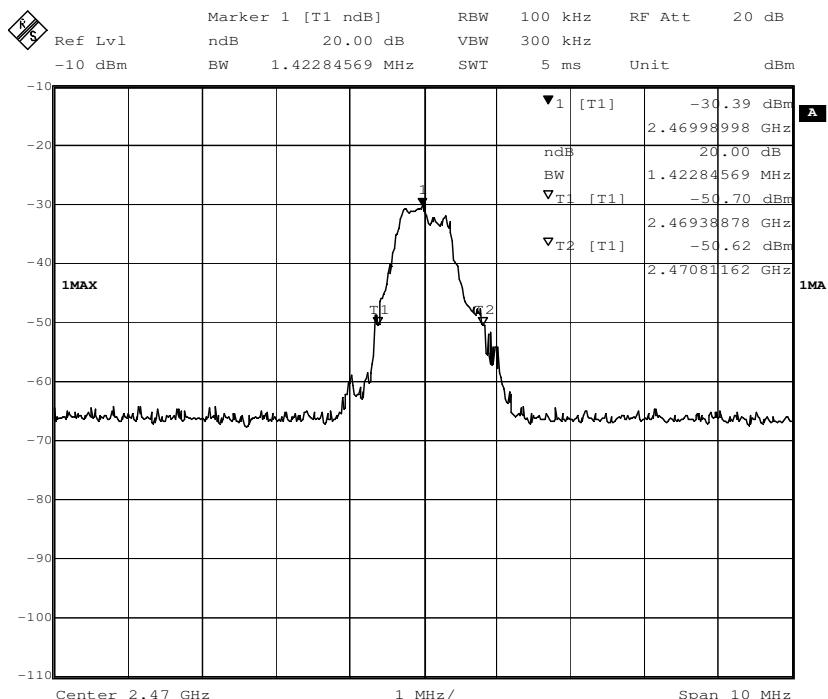
Test Method: ANSI C63.10: Clause 6.9.1

Operation within the band 2.400 to 2.4835 GHz

Method of measurement: A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken.

1. Test in the lowest frequency 2.405 GHz



2. Test in the middle frequency 2.436 GHz

3. Test in the highest frequency 2.470 GHz


The results: The unit does meet the FCC requirements.

--End of the report--