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Report No.: GZEM130600263001  
Page: 1 of 27  
FCC ID: 2AALA1306

# TEST REPORT

Application No.:	GZEM1306002630RF
Applicant:	Shantou City Hengdi Industry Co., Ltd
FCC ID:	2AALA1306
Product Name:	Remote Control Aircraft Series
Product Description:	Wireless remote control with 2.4 GHz as carrier.
Model No.:	1212, 1301, 1302, 1305, 1306, 1209, 1203, 1217, 1218, 1202, 1204, 1207, 1307, 1308, 1309, 1312, 1311, 1310, HM0710, HM0707, HM0920, HM0929, HM0945, HM0946, HM0960, HM0961, HM0962, HM0955, HM0971, HM0942, 1215, 1303, 1304, 1206, 1306, 1307 ♣
♣	Please refer to section 3 of this report for details
Standards:	47 CFR PART 15 Subpart C: 2012 section 15.249
Date of Receipt:	2013-06-19
Date of Test:	2013-06-21 to 2013-07-08
Date of Issue:	2013-07-29
Test Result :	Pass*

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

Richard Li  
Manager

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.

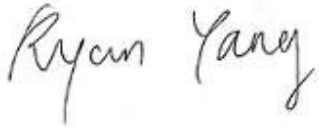
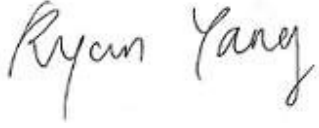

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2013-07-29		Original

<b>Authorized for issue by:</b>			
<b>Tested By</b>		<b>(Ryan Yang) / Project Engineer</b>	2013-06-21 to 2013-07-08 <b>Date</b>
<b>Prepared By</b>		<b>(Ryan Yang) / Project Engineer</b>	2013-07-17 <b>Date</b>
<b>Checked By</b>		<b>(Storm Shu) / Reviewer</b>	2013-07-29 <b>Date</b>



### 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.: **1212**, 1301, 1302, 1305, 1306, 1209, 1203, 1217, 1218, 1202, 1204, 1207, 1307, 1308, 1309, 1312, 1311, 1310, HM0710, HM0707, HM0920, HM0929, HM0945, HM0946, HM0960, HM0961, HM0962, HM0955, HM0971, HM0942, 1215, 1303, 1304, 1206, 1306, 1307

According to the confirmation from the applicant, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, only difference is the color, appearance and packing.

Therefore only one item **1212** was tested in this report.



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## 5 General Information

### 5.1 Client Information

Applicant: Shantou City Hengdi Industry Co., Ltd  
Address of Applicant: West of NingchuanBei Road and South of Huancui Roda, Guangyi St,  
Chenghai District, Shantou City, Guangdong Province, China

### 5.2 General Description of E.U.T.

Product Name: Remote Control Aircraft Series  
Model No.: 1212

### 5.3 Details of E.U.T.

Operating Frequency: 2402 MHz to 2475 MHz  
Type of Modulation: FSK  
Number of Channels: 20 (hopping over > 90 % of the assigned frequency band)  
Channel Separation: More than 1MHz  
Antenna Type: Integral Antenna  
Antenna gain: 2.45 dBi  
Function: The EUT is a set of equipment. With FHSS technology, the aircraft an controller will hop between 2402 MHz and 2475 MHz with 20 channels to transfer data.  
Power Supply: DC 6V = DC 1.5V 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.





## 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-ELEKTRONIK	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)
0	2402	10	2448
1	2405	11	2450
2	2410	12	2452
3	2411	13	2458
4	2425	14	2460
5	2430	15	2463
6	2431	16	2465
7	2433	17	2468
8	2435	18	2470
9	2442	19	2475

Test frequencies are the lowest channel: 0 channel (2402MHz), middle channel: 7 channel (2433MHz) and highest channel: 19 channel (2475MHz).

## 7.2 Antenna Requirement

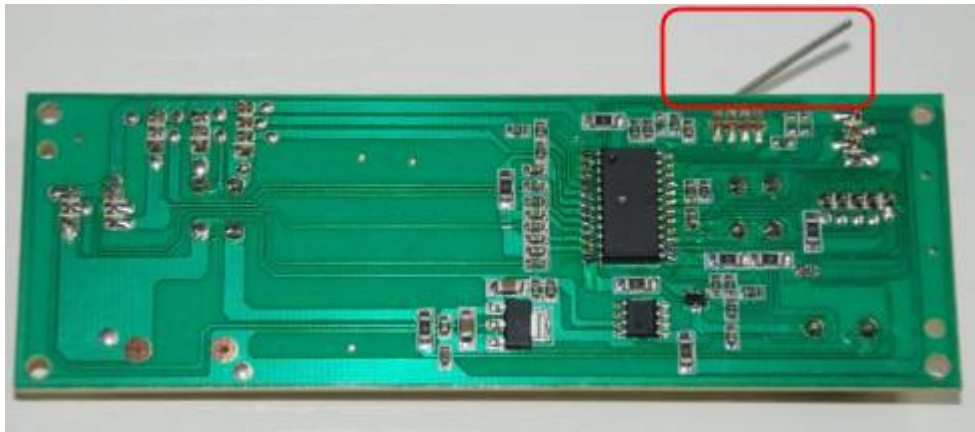
### Standard requirement

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 2.45 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 Part 15 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 (dBµV/m @ 3m)	Field Strength of Harmonics (dBµV/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 2402MHz ~ 2475MHz.

The limit for Average field strength dBµV/m for the fundamental frequency = 94.0 dBµV/m.

The limit for Peak field strength dBµV/m for the fundamental frequency = 114.0 dBµV/m.

No fundamental is allowed in the restricted bands.

The limit for average field strength dBµV/m for the harmonics = 54.0 dBµV/m.

The limit for peak field strength dBµV/m for the harmonics = 74.0 dBµV/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 dBµV/m in 15.209. Here the limit for the other emission is 54.0 dBµV/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.

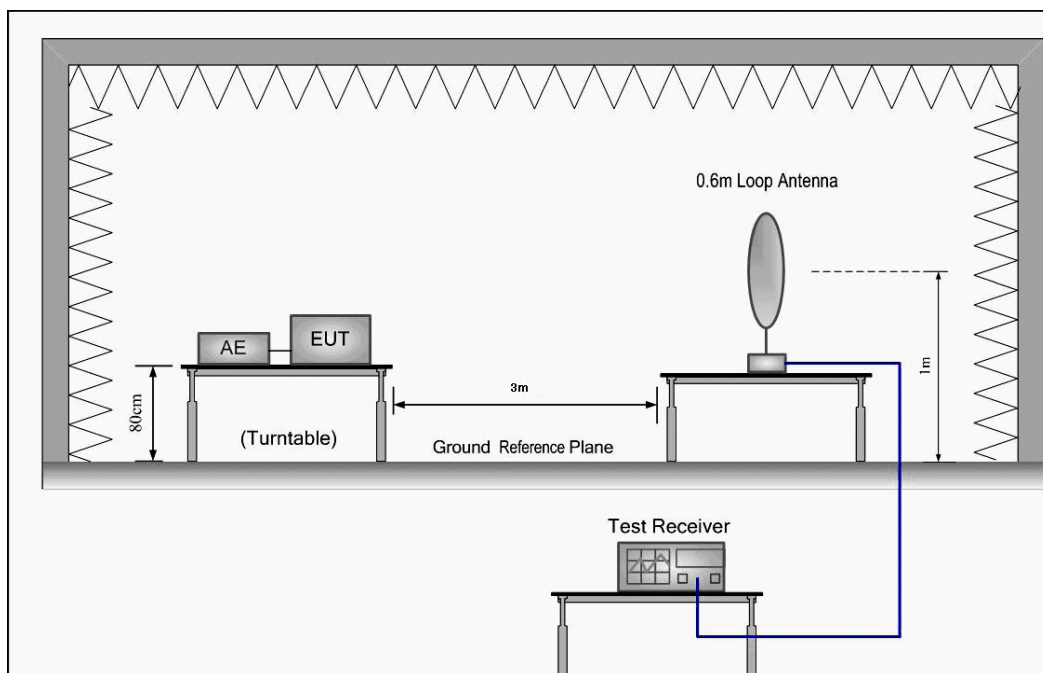
3) 1 GHz to 25 GHz emissions:

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.

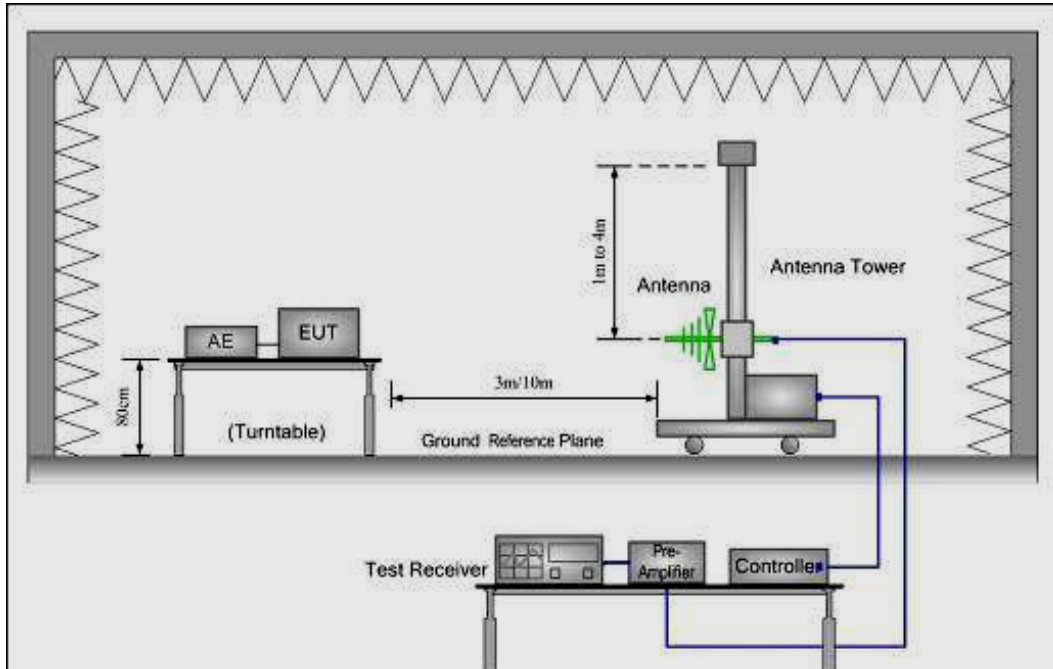
For testing performed with the horn antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360°, the antenna height scan between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

**Test Configuration:**

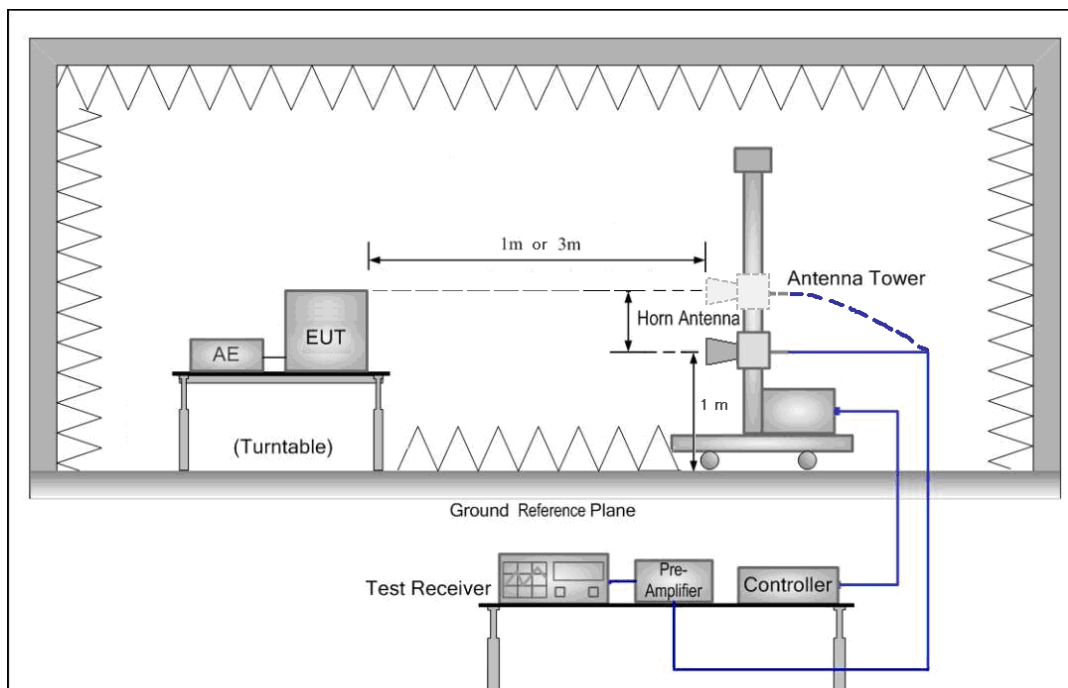
1) 9 kHz to 30 MHz emissions:



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 & Pre-amplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Preamplifier Factor}$$

**Test at low Channel in transmitting status**

**9 kHz~30 MHz Field Strength of Unwanted Emissions. Quasi-Peak Measurement**

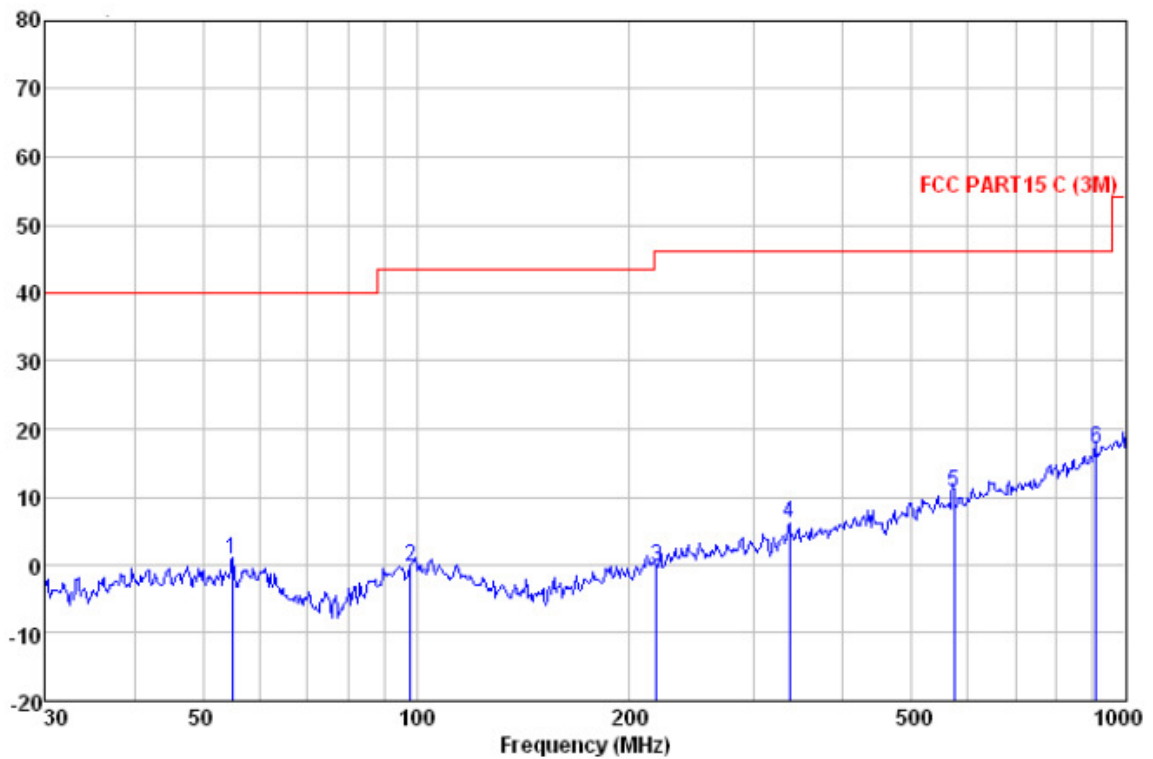
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

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

Vertical:

Peak scan

Level (dBμV/m)



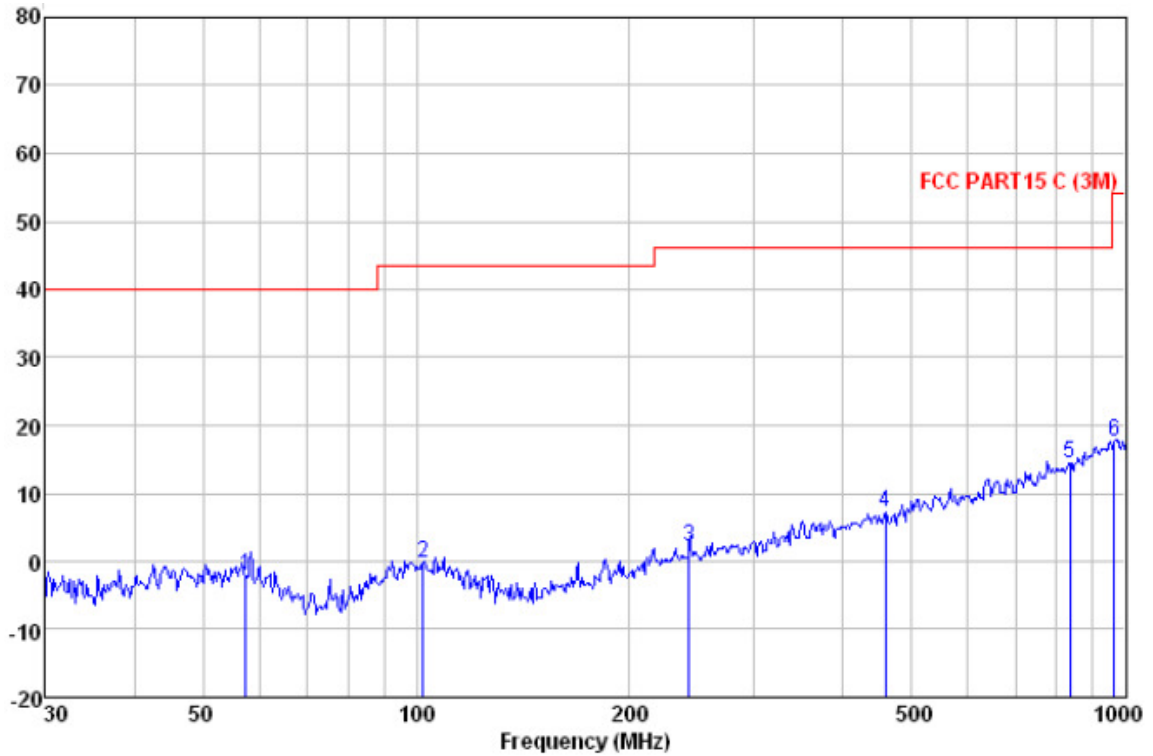
Quasi-peak measurement

Read Antenna	Cable Preamp	Limit	Over						
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
55.027	18.35	13.02	1.06	31.60	0.83	40.00	-39.17	QP	
98.142	16.95	13.03	1.41	31.60	-0.21	43.50	-43.71	QP	
218.309	18.01	11.13	1.99	31.30	-0.17	46.00	-46.17	QP	
336.035	20.80	13.99	2.50	31.22	6.07	46.00	-39.93	QP	
572.614	20.67	17.98	3.18	31.28	10.55	46.00	-35.45	QP	
909.667	22.64	21.15	4.17	31.02	16.94	46.00	-29.06	QP	



**Horizontal:**

Peak scan  
 Level (dBµV/m)



Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBµV	dB/m	dB	dB	dBµV/m	dBµV/m	dB	
57.392	15.57	12.85	1.09	31.60	-2.09	40.00	-42.09	QP
102.360	17.00	12.92	1.45	31.59	-0.22	43.50	-43.72	QP
242.525	19.31	12.08	2.11	31.30	2.20	46.00	-43.80	QP
459.114	19.71	15.59	2.96	31.17	7.09	46.00	-38.91	QP
836.244	21.26	20.46	3.95	31.16	14.51	46.00	-31.49	QP
965.542	22.44	21.52	4.22	30.52	17.66	54.00	-36.34	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 (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2402.00	27.58	6.14	49.43	98.44	82.73	114.00	V
4804.00	31.53	8.98	49.30	63.09	54.30	74.00	V
7206.00	36.47	12.32	49.73	56.57	55.63	74.00	V
9608.00	38.08	16.30	49.89	50.12	54.61	74.00	V
2402.00	27.58	6.14	49.43	98.44	82.73	114.00	H
4804.00	31.53	8.98	49.30	62.91	54.12	74.00	H
7206.00	36.47	12.32	49.73	53.79	52.85	74.00	H
9608.00	38.08	16.30	49.89	50.99	55.48	74.00	H
Average Measurement:							
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2402.00	27.58	6.14	49.43	93.44	77.73	94.00	V
4804.00	31.53	8.98	49.30	58.09	49.30	54.00	V
7206.00	36.47	12.32	49.73	50.57	49.63	54.00	V
9608.00	38.08	16.30	49.89	44.12	48.61	54.00	V
2402.00	27.58	6.14	49.43	92.44	76.73	94.00	H
4804.00	31.53	8.98	49.30	57.91	49.12	54.00	H
7206.00	36.47	12.32	49.73	49.79	48.85	54.00	H
9608.00	38.08	16.30	49.89	44.99	49.48	54.00	H





**Band Edge:**

<b>Peak Measurement:</b>							
<b>Frequency (MHz)</b>	<b>Antenna factors (dB/m)</b>	<b>Cable loss (dB)</b>	<b>Preamp factor (dB)</b>	<b>Reading Level (dB<math>\mu</math>V)</b>	<b>Emission Level (dB<math>\mu</math>V/m)</b>	<b>Limit (dB<math>\mu</math>V/m)</b>	<b>Antenna polarization</b>
2400.00	27.58	6.14	49.43	61.26	45.55	74.00	V
2483.50	27.55	6.30	49.41	61.52	45.96	74.00	V
2400.00	27.58	6.14	49.43	59.18	43.47	74.00	H
2483.50	27.55	6.30	49.41	60.66	45.10	74.00	H

<b>Average Measurement:</b>							
<b>Frequency (MHz)</b>	<b>Antenna factors (dB/m)</b>	<b>Cable loss (dB)</b>	<b>Preamp factor (dB)</b>	<b>Reading Level (dB<math>\mu</math>V)</b>	<b>Emission Level (dB<math>\mu</math>V/m)</b>	<b>Limit (dB<math>\mu</math>V/m)</b>	<b>Antenna polarization</b>
2400.00	27.58	6.14	49.43	56.26	40.55	54.00	V
2483.50	27.55	6.30	49.41	57.52	41.96	54.00	V
2400.00	27.58	6.14	49.43	53.18	37.47	54.00	H
2483.50	27.55	6.30	49.41	55.66	40.10	54.00	H



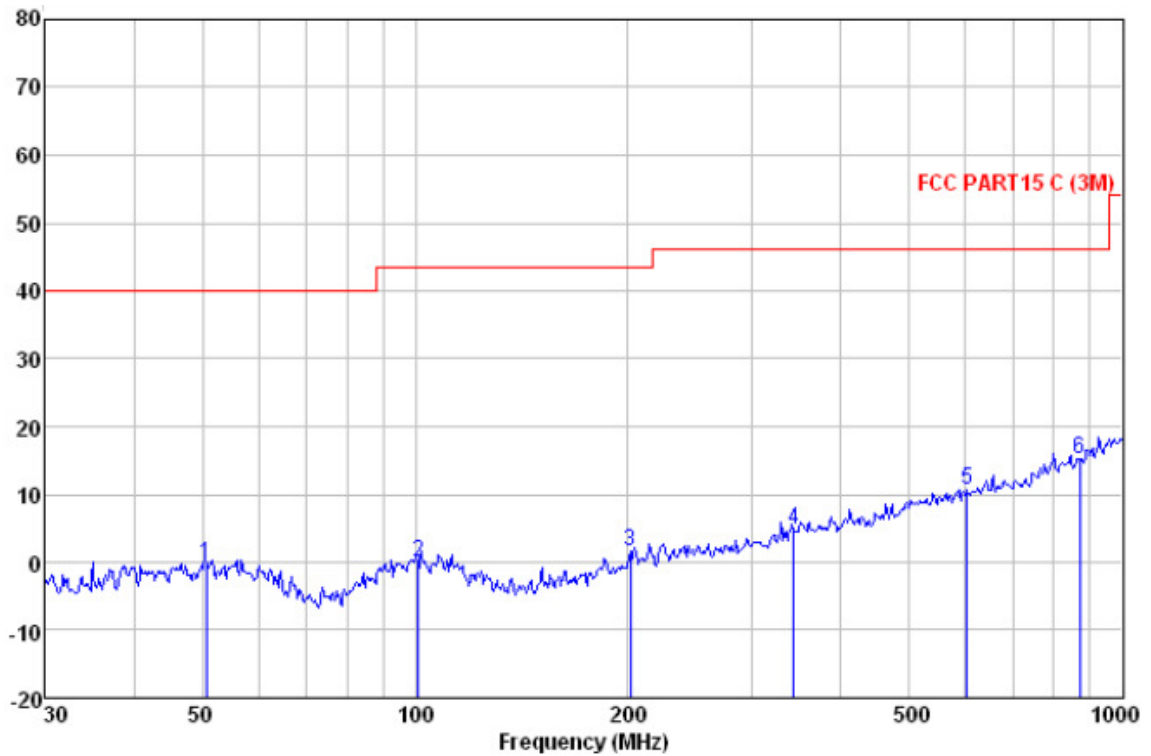
**Test at middle Channel in transmitting status**

**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 (dBμV/m)



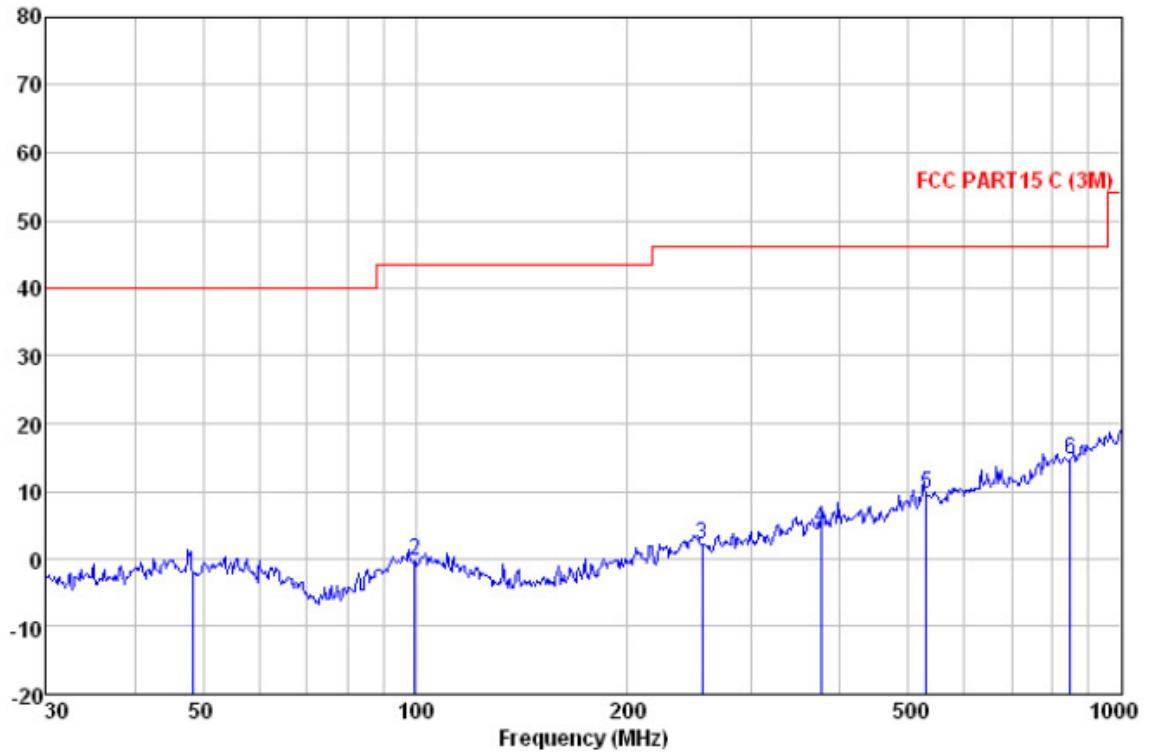
Quasi-peak measurement

Freq	ReadAntenna	Cable	Preamp	Limit	Over		
MHz	Level	Factor	Loss	Factor	Level	Line	Limit
	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
50.586	17.01	13.22	1.01	31.60	-0.36	40.00	-40.36
100.934	17.22	13.06	1.44	31.60	0.12	43.50	-43.38
201.393	20.32	10.60	1.89	31.30	1.51	43.50	-41.99
343.180	19.18	14.17	2.53	31.20	4.68	46.00	-41.32
603.539	20.20	18.46	3.29	31.29	10.66	46.00	-35.34
869.130	21.62	20.78	4.05	31.13	15.32	46.00	-30.68



**Horizontal:**

Peak scan  
 Level (dB $\mu$ V/m)



Quasi-peak measurement

Freq	ReadAntenna Level	Cable Preamp Loss Factor	Limit Line	Over Limit	Remark
MHz	dB $\mu$ V	dB/m	dB	dB	
48.332	15.15	13.35	0.99	31.60	-2.11 40.00 -42.11 QP
99.878	16.84	13.16	1.43	31.60	-0.17 43.50 -43.67 QP
254.728	19.12	12.06	2.17	31.30	2.05 46.00 -43.95 QP
375.939	18.38	14.56	2.64	31.13	4.45 46.00 -41.55 QP
530.101	20.41	17.20	3.09	31.23	9.47 46.00 -36.53 QP
848.056	21.38	20.55	3.97	31.15	14.75 46.00 -31.25 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 (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2433.00	27.57	6.20	49.42	96.62	80.97	114.00	V
4866.00	31.56	8.63	49.30	61.93	52.82	74.00	V
7299.00	36.49	12.28	49.74	54.72	53.75	74.00	V
9732.00	38.40	15.70	49.89	47.18	51.39	74.00	V
2433.00	27.57	6.20	49.42	97.17	81.52	114.00	H
4866.00	31.56	8.63	49.30	63.68	54.57	74.00	H
7299.00	36.49	12.28	49.74	55.44	54.47	74.00	H
9732.00	38.40	15.70	49.89	51.41	55.62	74.00	H
Average Measurement:							
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2433.00	27.57	6.20	49.42	91.62	75.97	94.00	V
4866.00	31.56	8.63	49.30	57.93	48.82	54.00	V
7299.00	36.49	12.28	49.74	50.72	49.75	54.00	V
9732.00	38.40	15.70	49.89	42.18	46.39	54.00	V
2433.00	27.57	6.20	49.42	92.17	76.52	94.00	H
4866.00	31.56	8.63	49.30	59.68	50.57	54.00	H
7299.00	36.49	12.28	49.74	50.44	49.47	54.00	H
9732.00	38.40	15.70	49.89	46.41	50.62	54.00	H



**Band Edge:**

<b>Peak Measurement:</b>							
<b>Frequency (MHz)</b>	<b>Antenna factors (dB/m)</b>	<b>Cable loss (dB)</b>	<b>Preamp factor (dB)</b>	<b>Reading Level (dB<math>\mu</math>V)</b>	<b>Emission Level (dB<math>\mu</math>V/m)</b>	<b>Limit (dB<math>\mu</math>V/m)</b>	<b>Antenna polarization</b>
2400.00	27.58	6.14	49.43	59.31	43.60	74.00	V
2483.50	27.55	6.30	49.41	59.73	44.17	74.00	V
2400.00	27.58	6.14	49.43	59.38	43.67	74.00	H
2483.50	27.55	6.30	49.41	59.13	43.57	74.00	H

<b>Average Measurement:</b>							
<b>Frequency (MHz)</b>	<b>Antenna factors (dB/m)</b>	<b>Cable loss (dB)</b>	<b>Preamp factor (dB)</b>	<b>Reading Level (dB<math>\mu</math>V)</b>	<b>Emission Level (dB<math>\mu</math>V/m)</b>	<b>Limit (dB<math>\mu</math>V/m)</b>	<b>Antenna polarization</b>
2400.00	27.58	6.14	49.43	53.31	37.60	54.00	V
2483.50	27.55	6.30	49.41	54.73	39.17	54.00	V
2433.00	27.57	6.20	49.42	52.17	36.52	54.00	H
2483.50	27.55	6.30	49.41	55.13	39.57	54.00	H

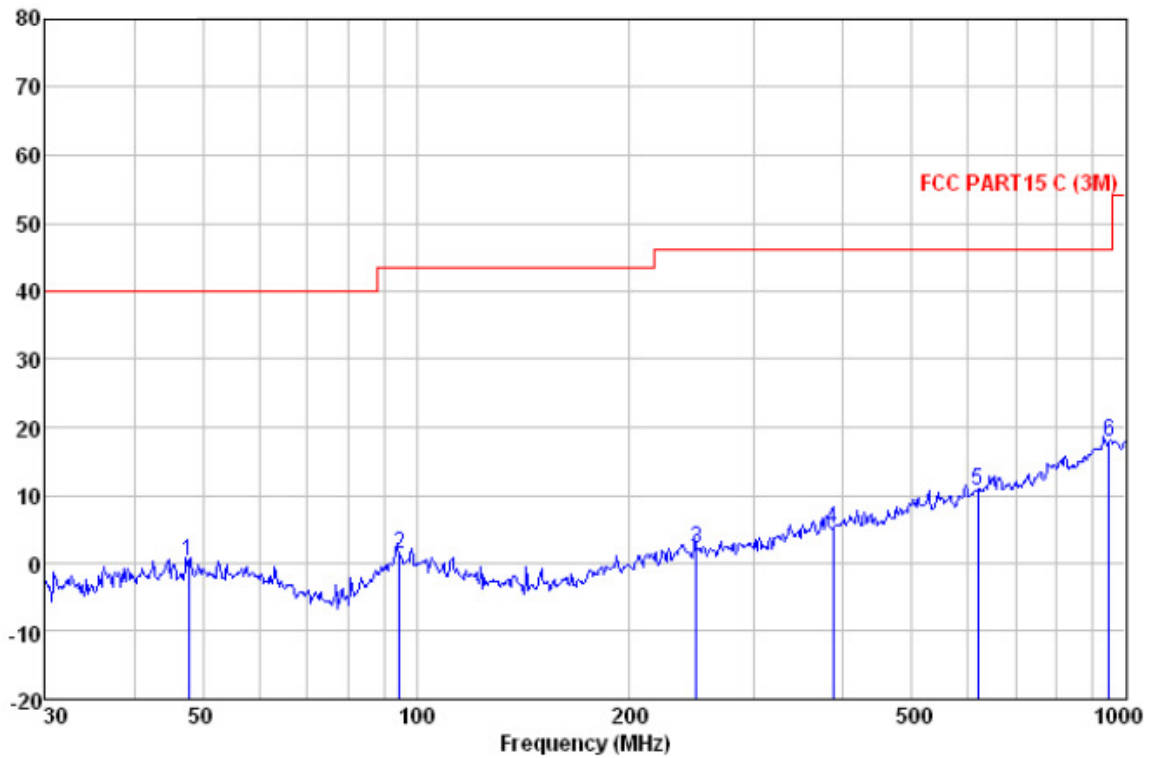
**Test at high Channel in transmitting status**

**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 $\mu$ V/m)

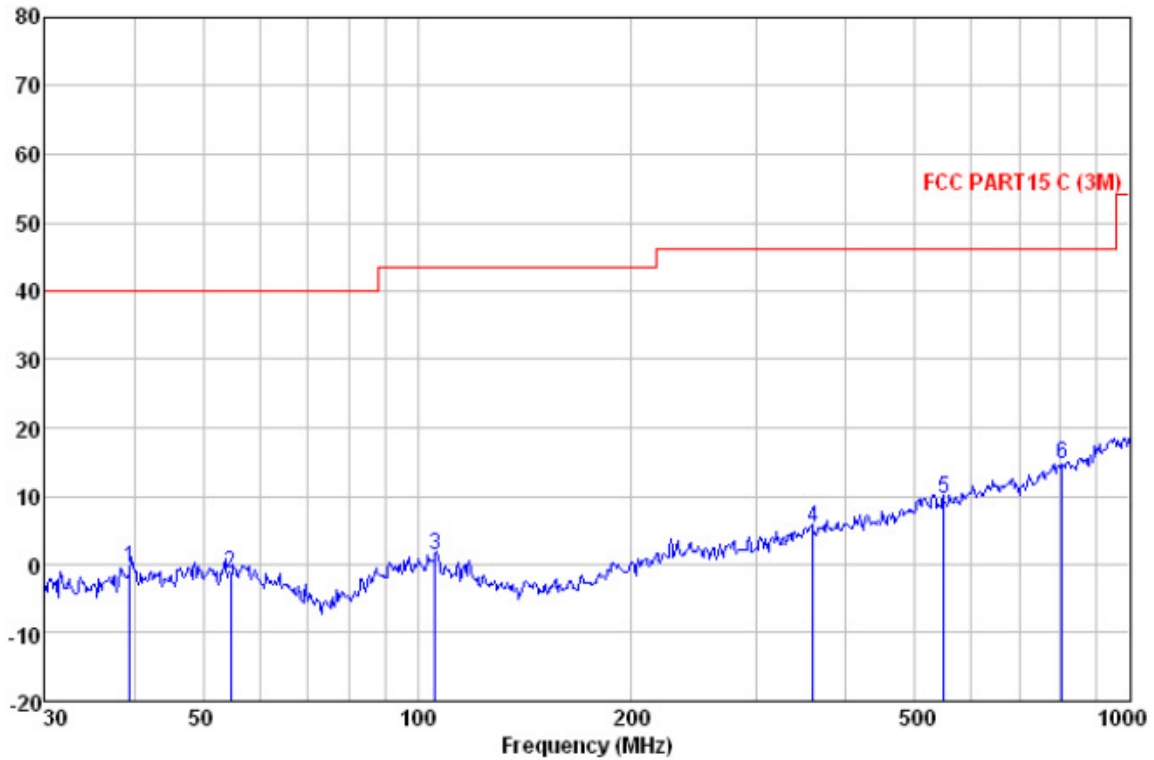


Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dB $\mu$ V	dB/m	dB	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
47.826	17.48	13.38	0.99	31.60	0.25	40.00	-39.75	QP
94.760	18.70	12.84	1.38	31.60	1.32	43.50	-42.18	QP
248.552	19.24	12.07	2.14	31.30	2.15	46.00	-43.85	QP
386.634	18.60	14.78	2.67	31.12	4.93	46.00	-41.07	QP
618.537	20.18	18.52	3.35	31.28	10.77	46.00	-35.23	QP
948.761	22.99	21.40	4.11	30.76	17.74	46.00	-28.26	QP

**Horizontal:**

Peak scan  
Level (dB $\mu$ V/m)



Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Limit Level	Over Limit	Remark
MHz	dB $\mu$ V	dB/m	dB	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
39.437	16.75	13.44	0.93	31.60	-0.48	40.00	-40.48 QP
54.643	16.07	13.03	1.06	31.60	-1.44	40.00	-41.44 QP
106.013	18.78	12.59	1.47	31.59	1.25	43.50	-42.25 QP
359.186	19.46	14.40	2.59	31.16	5.29	46.00	-40.71 QP
549.020	20.13	17.57	3.09	31.25	9.54	46.00	-36.46 QP
804.603	21.76	20.10	3.92	31.20	14.58	46.00	-31.42 QP



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

<b>Peak Measurement:</b>							
<b>Frequency (MHz)</b>	<b>Antenna factors (dB/m)</b>	<b>Cable loss (dB)</b>	<b>Preamp factor (dB)</b>	<b>Reading Level (dBμV)</b>	<b>Emission Level (dBμV/m)</b>	<b>Limit (dBμV/m)</b>	<b>Antenna polarization</b>
2475.00	27.56	6.27	49.41	100.79	85.21	114.00	V
4950.00	31.68	8.28	49.30	65.27	55.93	74.00	V
7425.00	36.57	12.14	49.75	56.27	55.23	74.00	V
9900.00	38.68	15.10	49.90	50.97	54.85	74.00	V
2475.00	27.56	6.27	49.41	99.87	84.29	114.00	H
4950.00	31.68	8.28	49.30	65.13	55.79	74.00	H
7425.00	36.57	12.14	49.75	56.22	55.18	74.00	H
9900.00	38.68	15.10	49.90	49.86	53.74	74.00	H
<b>Average Measurement:</b>							
<b>Frequency (MHz)</b>	<b>Antenna factors (dB/m)</b>	<b>Cable loss (dB)</b>	<b>Preamp factor (dB)</b>	<b>Reading Level (dBμV)</b>	<b>Emission Level (dBμV/m)</b>	<b>Limit (dBμV/m)</b>	<b>Antenna polarization</b>
2475.00	27.56	6.27	49.41	94.79	79.21	94.00	V
4950.00	31.68	8.28	49.30	60.27	50.93	54.00	V
7425.00	36.57	12.14	49.75	50.27	49.23	54.00	V
9900.00	38.68	15.10	49.90	45.97	49.85	54.00	V
2475.00	27.56	6.27	49.41	93.87	78.29	94.00	H
4950.00	31.68	8.28	49.30	60.13	50.79	54.00	H
7425.00	36.57	12.14	49.75	50.22	49.18	54.00	H
9900.00	38.68	15.10	49.90	44.86	48.74	54.00	H





**Band Edge:**

<b>Peak Measurement:</b>							
<b>Frequency (MHz)</b>	<b>Antenna factors (dB/m)</b>	<b>Cable loss (dB)</b>	<b>Preamp factor (dB)</b>	<b>Reading Level (dBμV)</b>	<b>Emission Level (dBμV/m)</b>	<b>Limit (dBμV/m)</b>	<b>Antenna polarization</b>
2400.00	27.58	6.14	49.43	60.08	44.37	74.00	V
2483.50	27.55	6.30	49.41	58.08	42.52	74.00	V
2400.00	27.58	6.14	49.43	59.84	44.13	74.00	H
2483.50	27.55	6.30	49.41	62.36	46.80	74.00	H
<b>Average Measurement:</b>							
<b>Frequency (MHz)</b>	<b>Antenna factors (dB/m)</b>	<b>Cable loss (dB)</b>	<b>Preamp factor (dB)</b>	<b>Reading Level (dBμV)</b>	<b>Emission Level (dBμV/m)</b>	<b>Limit (dBμV/m)</b>	<b>Antenna polarization</b>
2400.00	27.58	6.14	49.43	54.08	38.37	54.00	V
2483.50	27.55	6.30	49.41	54.08	38.52	54.00	V
2400.00	27.58	6.14	49.43	53.84	38.13	54.00	H
2483.50	27.55	6.30	49.41	58.36	42.80	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.

**Test result: The unit does meet the FCC requirements.**

## 7.4 Occupied Bandwidth

Test Requirement: FCC Part 15 C section 15.249

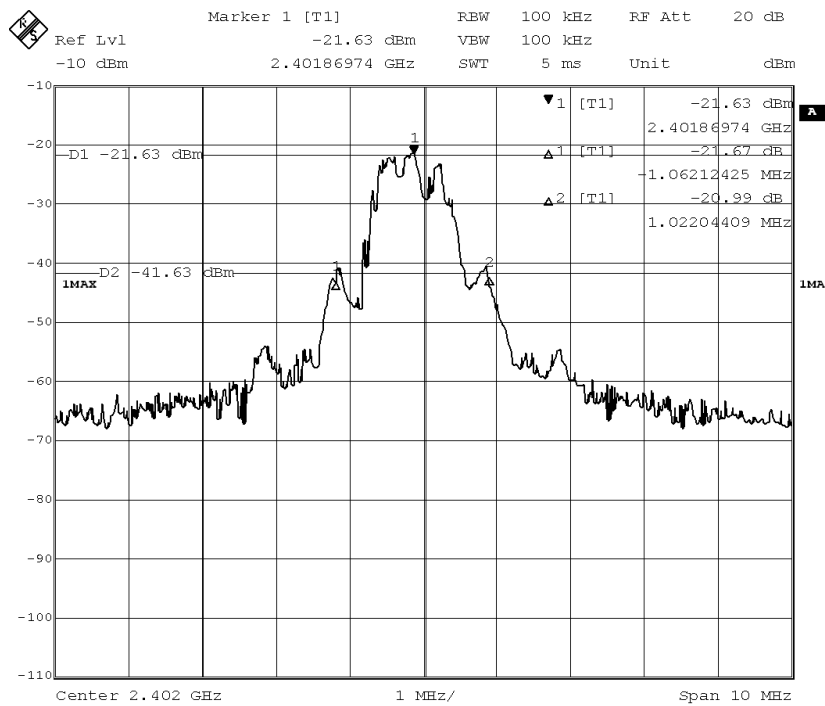
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Test Method: ANSI C63.10: Clause 6.9.1

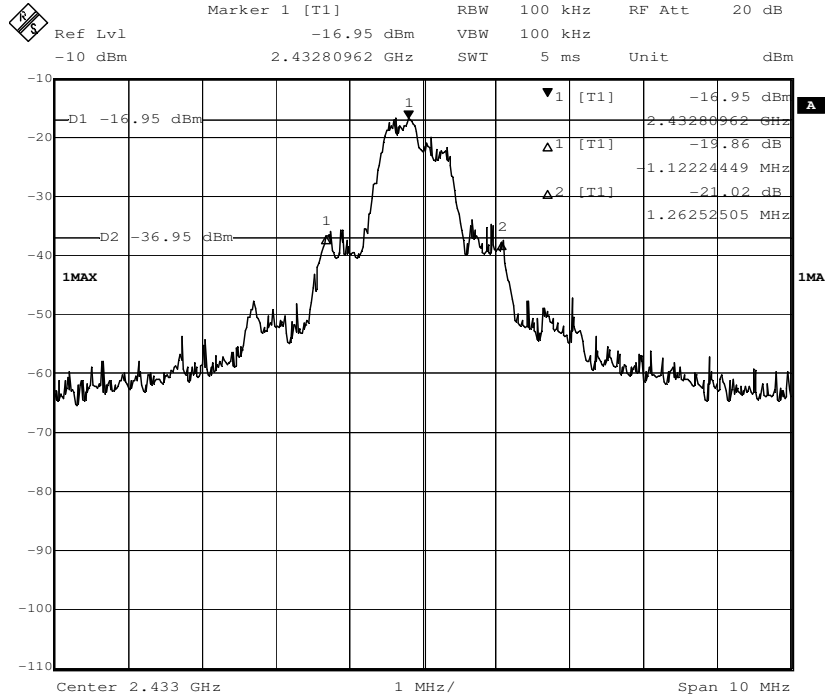
Operation within the band 2.400 to 2.4835 GHz

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

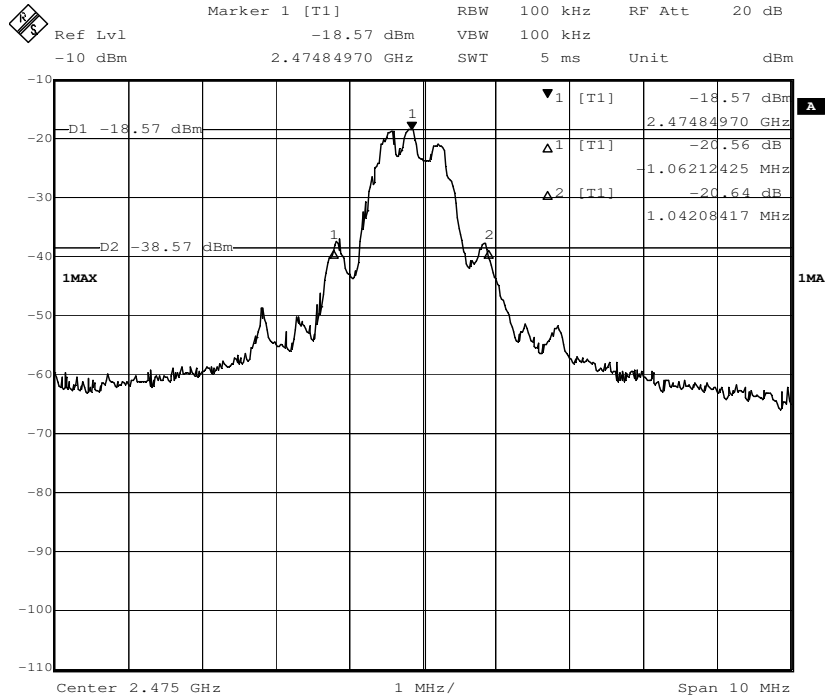
### 1. Test in the lowest frequency 2.402 GHz



**2. Test in the middle frequency 2.433 GHz**



**3. Test in the highest frequency 2.475 GHz**



The results: The unit does meet the FCC requirements.

--End of the report--