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Registration number: 282399

Report No.: GZEM120100021401
Page: 1 of 28
FCC ID: AVJ-4316T

TEST REPORT

Application No.:	GZEM1201000214RF (SGS HK NO.: 2025462/EE)
Applicant:	Bigben Interactive (HK) Ltd
FCC ID:	AVJ-4316T
Product Name:	Quickfire Controller for PS3
Product Description:	Radio control PS3/PC game with 2.4GHz as carrier
Model No.:	BB4316
Standards:	FCC PART 15 Subpart C: 2010 section 15.249
Date of Receipt:	2012-02-01
Date of Test:	2012-02-02 to 2012-02-13
Date of Issue:	2012-02-23
Test Result :	Pass*

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

Strong Yao
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		2012-02-23		Original

Authorized for issue by:			
Tested By		<u>2012-02-02 to 2012-02-13</u>	Date
	(Storm Shu) / Project Engineer		
Prepared By		<u>2012-02-20</u>	Date
	(Storm Shu) / Project Engineer		
Checked By		<u>2012-02-23</u>	Date
	Strong Yao/ Reviewer		



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.



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5 General Information

5.1 Client Information

Applicant: Bigben Interactive (HK) Ltd.
Address of Applicant: Unit 1505, 148 Electric Road, North Point, Hong Kong SAR China

5.2 General Description of E.U.T.

Product Name: Quickfire Controller for PS3
Model No.: BB4316

5.3 Details of E.U.T.

Operating Frequency: 2402MHz to 2480MHz
Type of Modulation: GFSK
Number of Channels: 79
Channel Separation: 1 MHz
Antenna Type: single-ended monopole PCB antenna
Antenna gain: 1 dBi
Function: The EUT is a set of equipment.
With FHSS technology, the controller and dongle will hop between 2402 MHz and 2480 MHz with 79 channels to transfer data.
Power Supply: DC 3.0 V size "AA" batteries x 2 for Parental Controller.
Power cord: N/A

EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	11	2413	22	2424
1	2403	12	2414	23	2425
2	2404	13	2415	24	2426
3	2405	14	2416	25	2427
4	2406	15	2417	26	2428
5	2407	16	2418	27	2429
6	2408	17	2419	28	2430
7	2409	18	2420	29	2431
8	2410	19	2421	30	2432
9	2411	20	2422	31	2433
10	2412	21	2423	32	2434



33	2435	49	2451	65	2467
34	2436	50	2452	66	2468
35	2437	51	2453	67	2469
36	2438	52	2454	68	2470
37	2439	53	2455	69	2471
38	2440	54	2456	70	2472
39	2441	55	2457	71	2473
40	2442	56	2458	72	2474
41	2443	57	2459	73	2475
42	2444	58	2460	74	2476
43	2445	59	2461	75	2477
44	2446	60	2462	76	2478
45	2447	61	2463	77	2479
46	2448	62	2464	78	2480
47	2449	63	2465		
48	2450	64	2466		

Test frequencies are the lowest channel: 0 channel(2402MHz), middle channel: 39 channel(2441MHz) and highest channel: 78 channel(2480MHz).

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, IEC 61010-1:2006-10 and Rule of procedure IEC 61010-2:2006-10, and the relevant IEC 61010-2-006-10 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	2012-09-06	2Y
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2012-11-11	1Y
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	10036	2012-06-01	1Y
EMC0528	RI High frequency Cable	SGS	20 m	N/A	2012-06-09	1Y
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS-ELEKTRONIK	VULB 9163	9163-450	2012-10-20	1Y
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2012-11-28	1Y
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2012-11-28	1Y
EMC2026	Horn Antenna 1-18GHz	R&S	BBHA 9120D	9120D-841	2012-10-20	1Y
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2012-08-29	1Y
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2012-08-29	1Y
EMC0049	Amplifier	Agilent	8447D	2944A10862	2012-04-21	1Y
EMC0075	310N Amplifier	Sonoma	310N	272683	2012-08-29	1Y
EMC0523	Active Loop Antenna	EMCO	6502	42963	2012-11-17	1Y
EMC2041	Broad-Band Horn Antenna (14)15-26.5(40)GHz	SCHWARZBECK MESS-ELEKTRONI	BBHA 9170	9170-375	2012-06-01	1Y
EMC0530	10m Semi-Anechoic Chamber	ETS	N/A	N/A	2012-05-10	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	2012-11-14	1Y
EMC0007	DMM	Fluke	73	70671122	2012-11-14	1Y

7 Test Results

7.1 E.U.T. Operation

Test Voltage:	DC 3.0 V
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



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 a single-ended monopole PCB antenna and no consideration of replacement. The best case gain of the antenna is 1 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 ~ 2480MHz.

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: 30 MHz – 25 GHz for transmitting mode.

Test instrumentation resolution bandwidth
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:

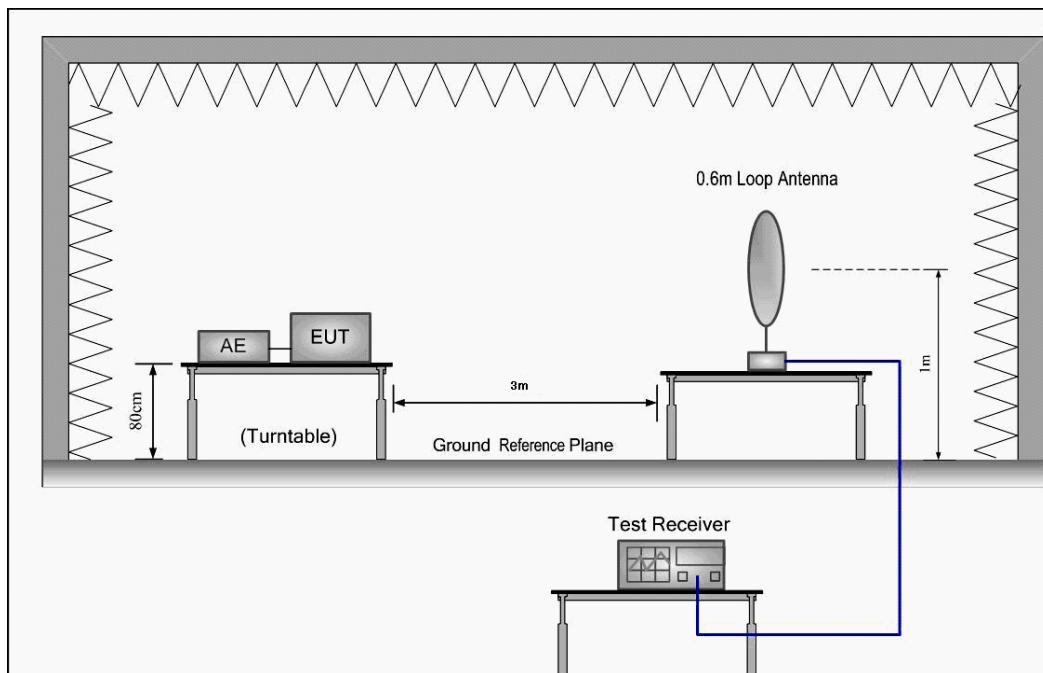
For testing performed with the bi-log type antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna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

3) 1 GHz to 25 GHz emissions:

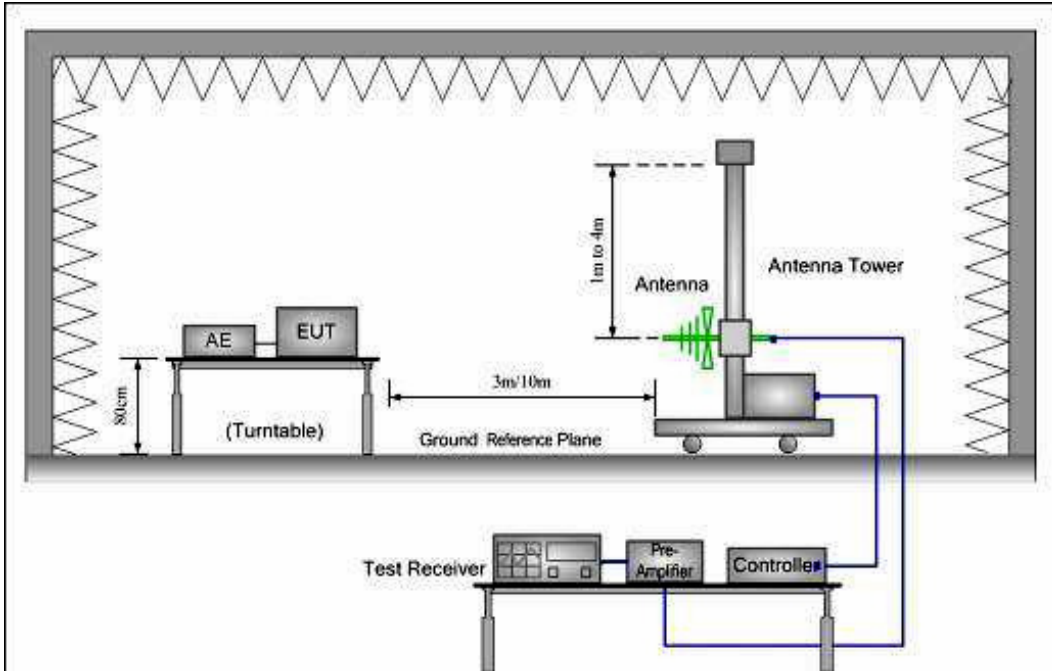
For testing performed with the horn antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360°, the antenna height scan between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

Test Configuration:

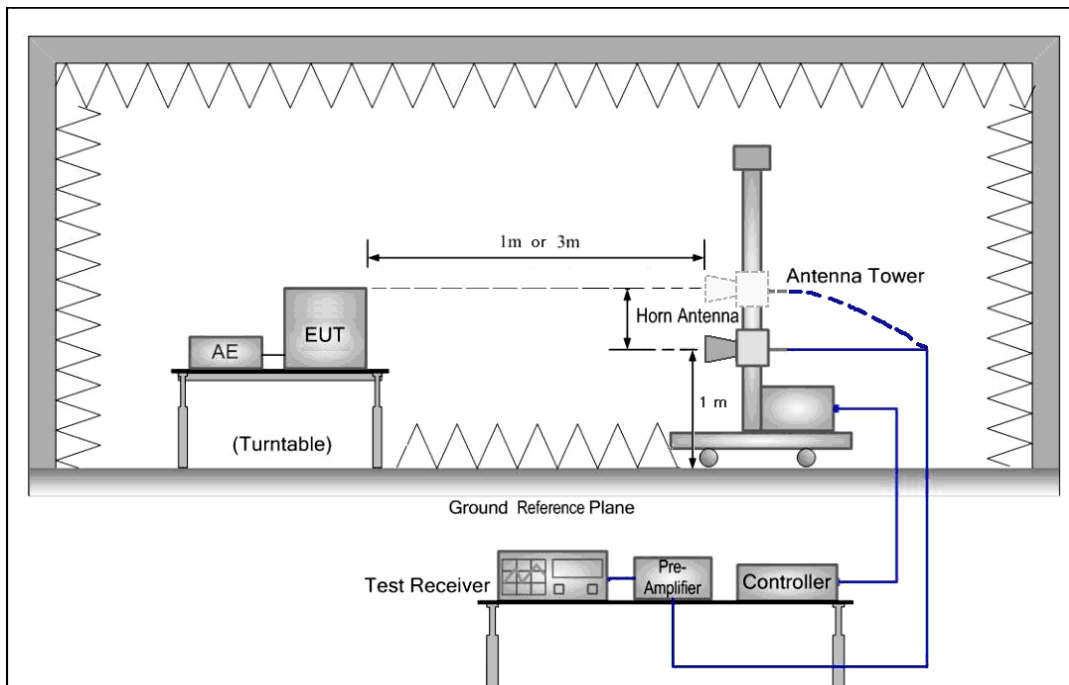
1) 9 kHz to 30 MHz emissions:



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:

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



Test at low Channel in transmitting status

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

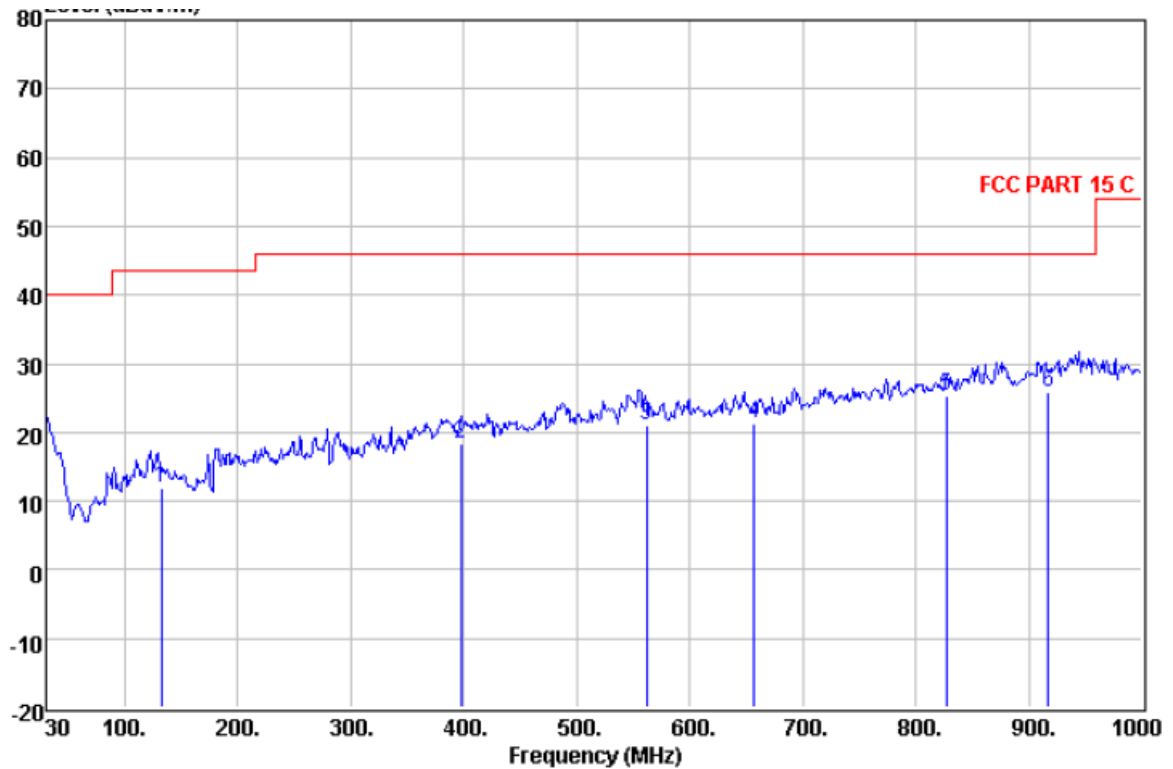
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

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

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

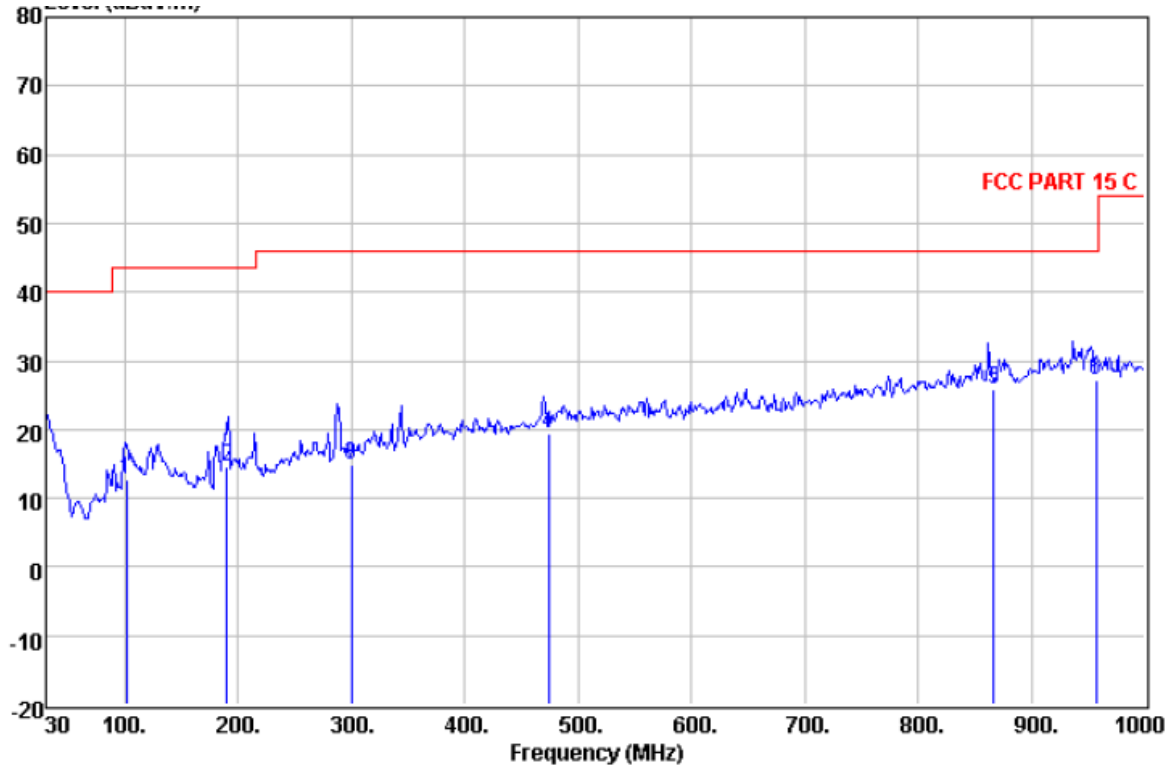
Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Over Level	Limit	Line	Remark
MHz	dBμV	dB/m	dB	dB	dBμV/m	dB	dBμV/m	
131.850	26.35	11.89	1.13	27.50	11.87	-31.63	43.50	QP
397.630	28.07	15.90	2.08	27.75	18.30	-27.70	46.00	QP
561.560	28.42	18.40	2.53	28.25	21.10	-24.90	46.00	QP
656.620	28.02	18.64	2.71	28.09	21.28	-24.72	46.00	QP
827.340	28.98	20.58	3.20	27.36	25.40	-20.60	46.00	QP
917.550	28.15	20.97	3.53	26.77	25.88	-20.12	46.00	QP



Horizontal:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Over Limit	Limit Line	Remark
MHz	dBµV	dB/m	dB	dB	dBµV/m	dB	dBµV/m	
101.360	28.36	11.03	1.01	27.67	12.73	-30.77	43.50	QP
190.060	32.06	8.40	1.28	27.27	14.47	-29.03	43.50	QP
300.010	27.48	12.60	1.81	27.07	14.82	-31.18	46.00	QP
474.299	27.95	17.17	2.31	27.97	19.46	-26.54	46.00	QP
866.840	28.85	20.63	3.36	27.03	25.81	-20.19	46.00	QP
956.890	29.30	21.23	3.62	26.85	27.30	-18.70	46.00	QP



SGS-CSTC Standards Technical Services Co., Ltd.

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

Peak & Average Measurement

Peak Measurement:

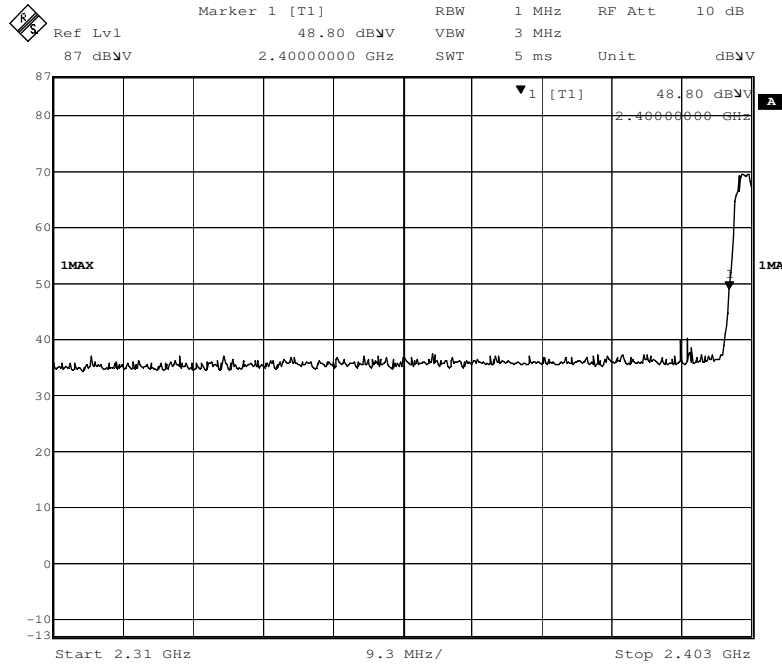
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2402.000	27.58	6.14	35.04	95.68	94.36	114.00	V
4804.000	31.35	8.98	34.30	50.10	56.31	74.00	V
5711.000	32.21	12.01	34.30	43.17	55.69	74.00	V
7206.000	36.52	12.23	34.30	42.89	57.30	74.00	V
2402.000	27.58	6.14	35.04	88.11	86.79	114.00	H
4804.000	31.35	8.98	34.30	49.79	56.00	74.00	H
5711.000	32.21	12.01	34.30	47.21	55.44	74.00	H
7206.000	36.52	12.23	34.30	42.90	57.35	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
2402.000	27.58	6.14	35.04	91.54	90.22	94.00	V
4804.000	31.35	8.98	34.30	44.39	50.60	54.00	V
5711.000	32.21	12.01	34.30	33.25	45.77	54.00	V
7206.000	36.52	12.23	34.30	32.25	46.66	54.00	V
2402.000	27.58	6.14	35.04	83.79	82.47	94.00	H
4804.000	31.35	8.98	34.30	44.19	50.40	54.00	H
5711.000	32.21	12.01	34.30	37.29	45.52	54.00	H
7206.000	36.52	12.23	34.30	32.37	46.82	54.00	H



Band Edge:



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
2400.00	27.58	6.14	35.04	47.69	46.37	74.00	V
2483.50	27.56	6.27	34.96	47.15	46.02	74.00	V
2400.00	27.58	6.14	35.04	49.26	47.94	74.00	H
2483.50	27.56	6.27	34.96	48.87	47.74	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
2400.00	27.58	6.14	35.04	36.70	35.38	54.00	V
2483.50	27.56	6.27	34.96	36.76	35.63	54.00	V
2400.00	27.58	6.14	35.04	34.90	33.58	54.00	H
2483.50	27.56	6.27	34.96	37.19	36.06	54.00	H



Test at middle Channel in transmitting status

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

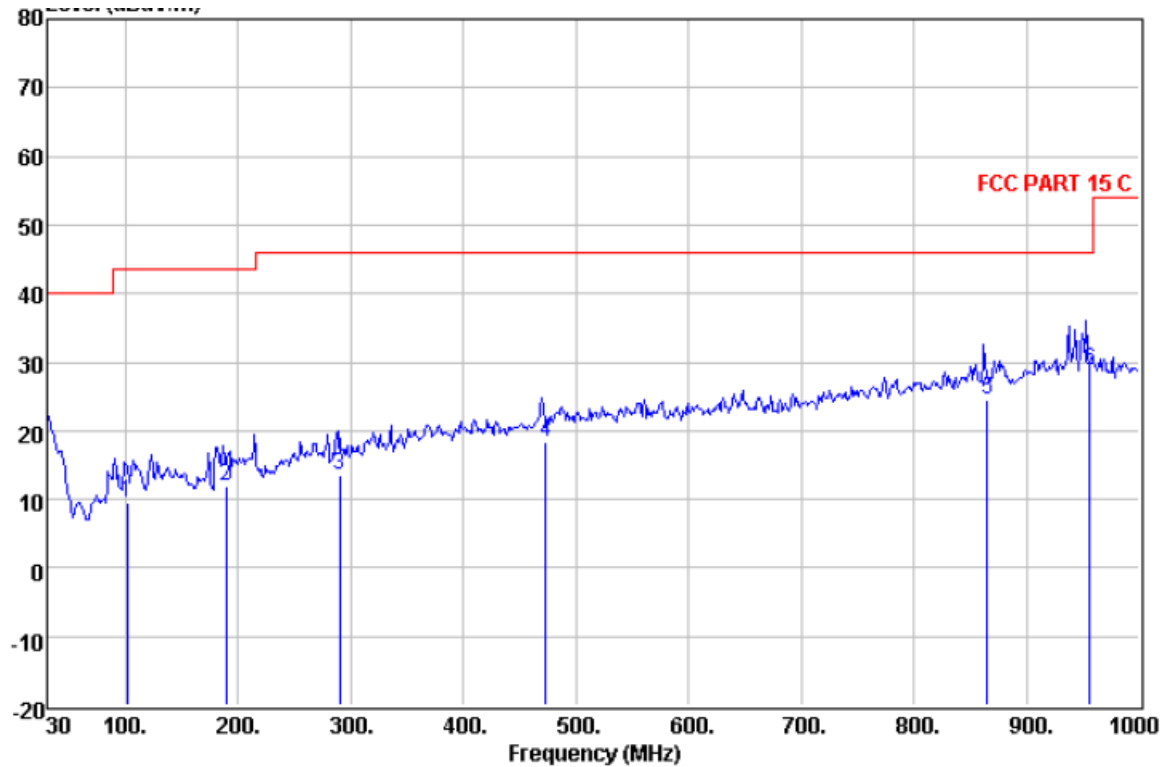
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

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

Vertical:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

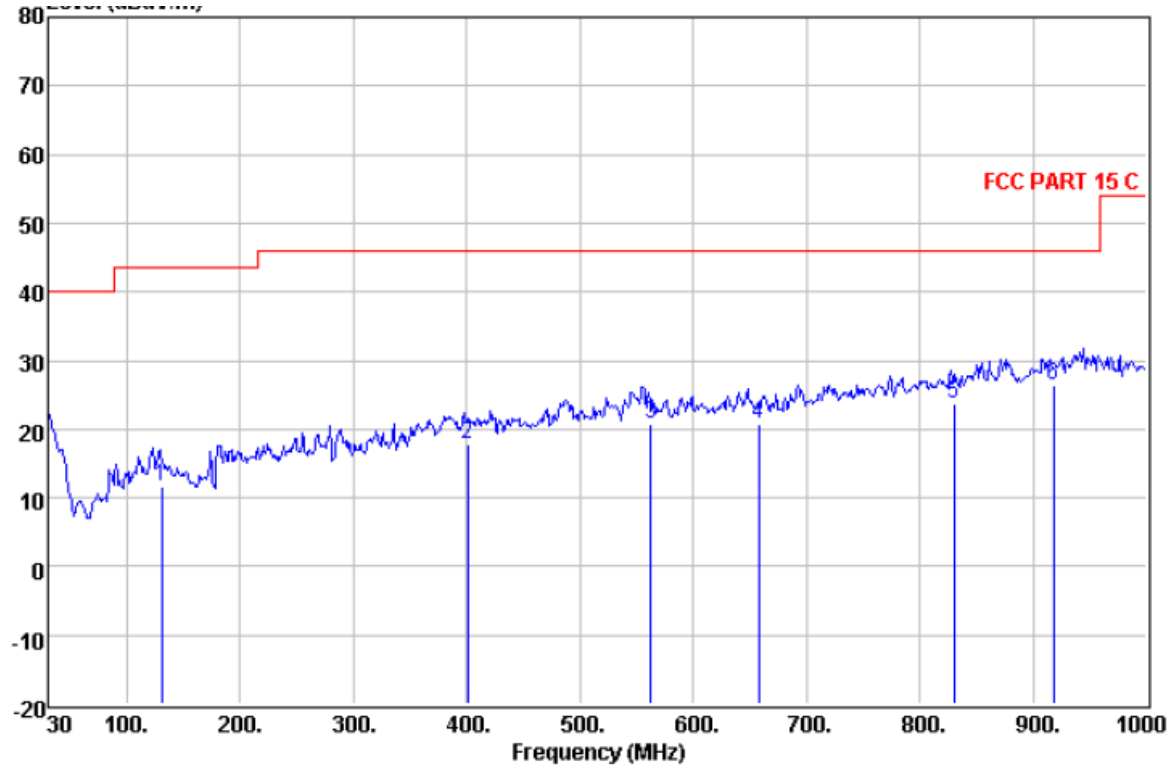
Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Over Limit	Limit	Remark
MHz	dBµV	dB/m	dB	dB	dBµV/m	dB	dBµV/m	
100.810	25.15	10.97	1.00	27.68	9.44	-34.06	43.50	QP
189.080	29.40	8.39	1.28	27.28	11.79	-31.71	43.50	QP
289.960	26.16	12.70	1.77	27.08	13.55	-32.45	46.00	QP
473.290	26.83	17.17	2.29	27.97	18.32	-27.68	46.00	QP
865.280	27.47	20.63	3.36	27.03	24.43	-21.57	46.00	QP
956.240	30.86	21.23	3.62	26.85	28.86	-17.14	46.00	QP



Horizontal:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Over Limit	Limit Line	Remark
MHz	dBµV	dB/m	dB	dB	dBµV/m	dB	dBµV/m	
130.520	26.04	11.97	1.13	27.51	11.63	-31.87	43.50	QP
400.960	27.59	16.00	2.08	27.77	17.90	-28.10	46.00	QP
562.380	28.16	18.40	2.53	28.26	20.83	-25.17	46.00	QP
657.800	27.50	18.62	2.71	28.08	20.75	-25.25	46.00	QP
830.150	27.37	20.60	3.22	27.36	23.83	-22.17	46.00	QP
918.100	28.66	21.00	3.53	26.77	26.42	-19.58	46.00	QP



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

Peak & Average Measurement

Peak Measurement:

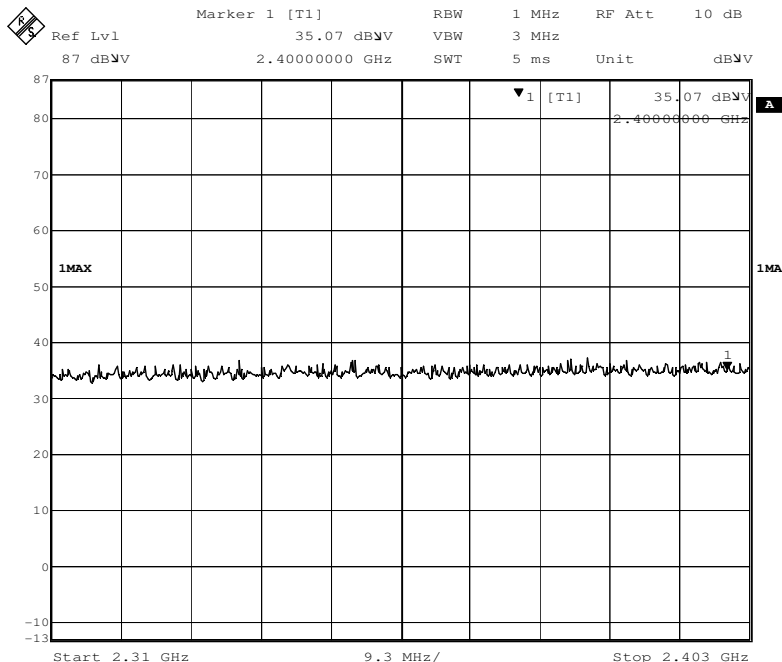
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dB μ V)	Emission Level (dB μ V/m)	Limit (dB μ V/m)	Antenna polarization
2442.000	27.57	6.20	35.01	95.14	93.90	114.00	V
4882.000	31.57	8.63	34.30	51.09	56.99	74.00	V
5494.000	32.04	11.24	34.30	47.29	56.27	74.00	V
7323.000	36.14	12.41	34.30	42.51	56.76	74.00	V
2442.000	27.57	6.20	35.01	93.04	91.80	114.00	H
4882.000	31.57	8.63	34.30	52.40	58.30	74.00	H
5494.000	32.04	11.24	34.30	44.99	55.11	74.00	H
7323.000	36.14	12.41	34.30	42.94	57.42	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
2442.000	27.57	6.20	35.01	89.26	88.02	94.00	V
4882.000	31.57	8.63	34.30	44.48	50.38	54.00	V
5494.000	32.04	11.24	34.30	39.48	48.46	54.00	V
7323.000	36.14	12.41	34.30	29.62	43.87	54.00	V
2442.000	27.57	6.20	35.01	87.61	86.37	94.00	H
4882.000	31.57	8.63	34.30	44.91	50.81	54.00	H
5494.000	32.04	11.24	34.30	34.99	45.11	54.00	H
7323.000	36.14	12.41	34.30	32.82	47.30	54.00	H



Band Edge:



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
2400.00	27.58	6.14	35.04	47.65	46.33	74.00	V
2483.50	27.56	6.27	34.96	47.33	46.20	74.00	V
2400.00	27.58	6.14	35.04	49.24	47.92	74.00	H
2483.50	27.56	6.27	34.96	48.18	47.05	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
2400.00	27.58	6.14	35.04	36.70	35.38	54.00	V
2483.50	27.56	6.27	34.96	36.29	35.16	54.00	V
2400.00	27.58	6.14	35.04	34.90	33.58	54.00	H
2483.50	27.56	6.27	34.96	37.92	36.79	54.00	H



Test at high Channel in transmitting status

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

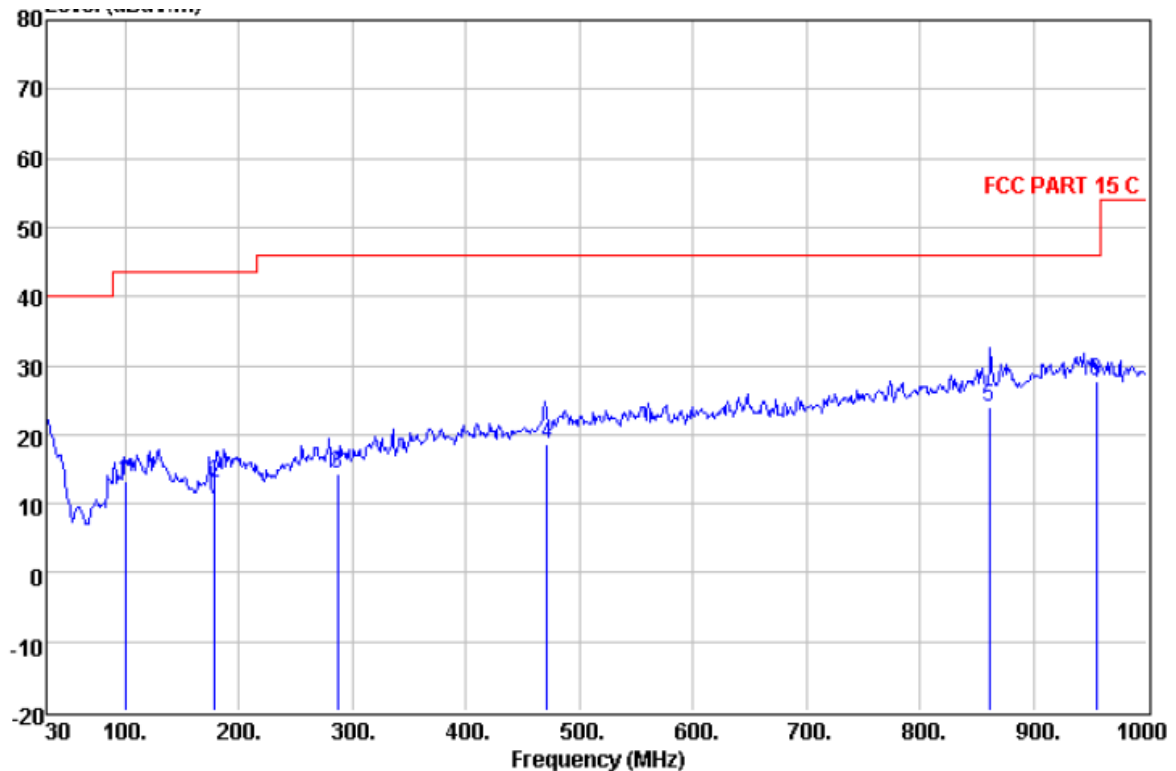
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

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

Vertical:

Peak scan

Level (dBμV/m)



Quasi-peak measurement

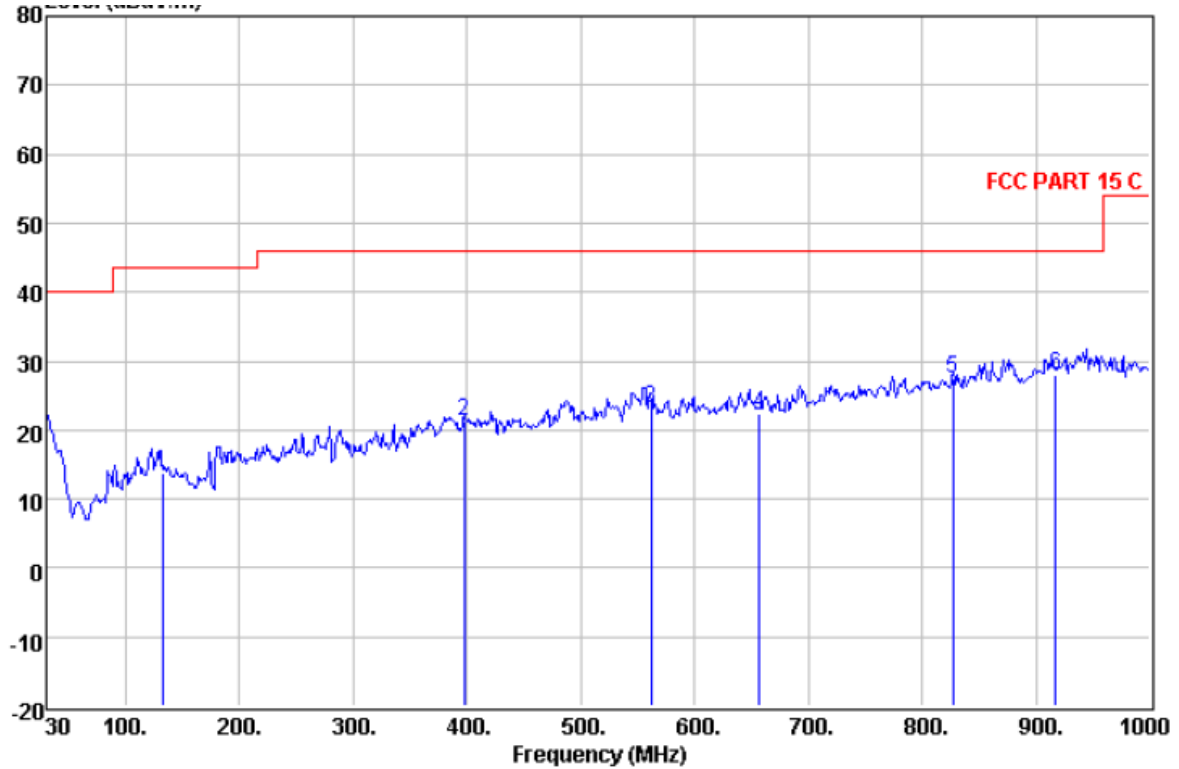
Freq MHz	ReadAntenna Level dBuV	Cable Factor dB/m	Preamp Loss dB	Factor dB	Level dBuV/m	Over Limit dB	Limit dBuV/m	Remark
99.540	29.19	10.73	1.00	27.68	13.24	-30.26	43.50	QP
178.650	31.29	7.68	1.26	27.31	12.92	-30.58	43.50	QP
286.540	27.17	12.46	1.76	27.09	14.30	-31.70	46.00	QP
471.170	27.08	17.10	2.29	27.97	18.50	-27.50	46.00	QP
861.240	27.14	20.50	3.33	27.06	23.91	-22.09	46.00	QP
955.700	29.65	21.23	3.61	26.85	27.64	-18.36	46.00	QP



Horizontal:

Peak scan

Level (dBµV/m)



Quasi-peak measurement

Freq	ReadAntenna	Cable	Preamp	Over	Limit	Line	Remark
MHz	Level	Factor	Loss	Factor	Level	Limit	dBµV/m
	dBµV	dB/m	dB	dB	dBµV/m	dB	dBµV/m
131.850	28.35	11.89	1.13	27.50	13.87	-29.63	43.50 QP
397.630	31.07	15.90	2.08	27.75	21.30	-24.70	46.00 QP
561.560	30.42	18.40	2.53	28.25	23.10	-22.90	46.00 QP
656.620	29.02	18.64	2.71	28.09	22.28	-23.72	46.00 QP
827.340	30.98	20.58	3.20	27.36	27.40	-18.60	46.00 QP
917.550	30.15	20.97	3.53	26.77	27.88	-18.12	46.00 QP



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

Peak & Average Measurement

Peak Measurement:

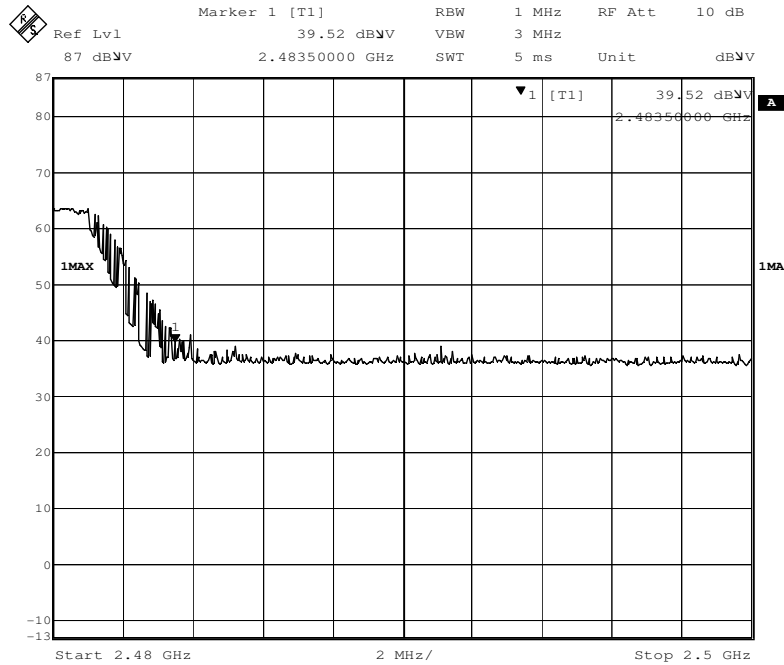
Frequency (MHz)	Antenna factors (dB/m)	Cable loss (dB)	Preamp factor (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Antenna polarization
2480.000	27.56	6.27	34.99	95.84	94.68	114.00	V
4960.000	31.70	8.28	34.30	53.87	59.55	74.00	V
6677.000	34.45	16.23	34.30	39.91	58.08	74.00	V
7440.000	36.62	12.85	34.30	43.27	57.73	74.00	V
2480.000	27.56	6.27	34.99	89.18	88.02	114.00	H
4960.000	31.70	8.28	34.30	52.96	58.64	74.00	H
6677.000	34.45	16.23	34.30	44.40	57.78	74.00	H
7440.000	36.62	12.85	34.30	44.14	59.31	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
2480.000	27.56	6.27	34.99	91.11	89.95	94.00	V
4960.000	31.70	8.28	34.30	45.12	50.80	54.00	V
6677.000	34.45	16.23	34.30	30.67	48.84	54.00	V
7440.000	36.62	12.85	34.30	31.01	45.47	54.00	V
2480.000	27.56	6.27	34.99	86.11	84.95	94.00	H
4960.000	31.70	8.28	34.30	44.88	50.56	54.00	H
6677.000	34.45	16.23	34.30	31.03	47.41	54.00	H
7440.000	36.62	12.85	34.30	34.12	49.29	54.00	H



Band Edge:



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
2400.00	27.58	6.14	35.04	47.69	46.37	74.00	V
2483.50	27.56	6.27	34.96	47.11	45.98	74.00	V
2400.00	27.58	6.14	35.04	49.26	47.94	74.00	H
2483.50	27.56	6.27	34.96	48.29	47.16	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
2400.00	27.58	6.14	35.04	36.70	35.38	54.00	V
2483.50	27.56	6.27	34.96	36.75	35.62	54.00	V
2400.00	27.58	6.14	35.04	34.90	33.58	54.00	H
2483.50	27.56	6.27	34.96	37.21	36.08	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

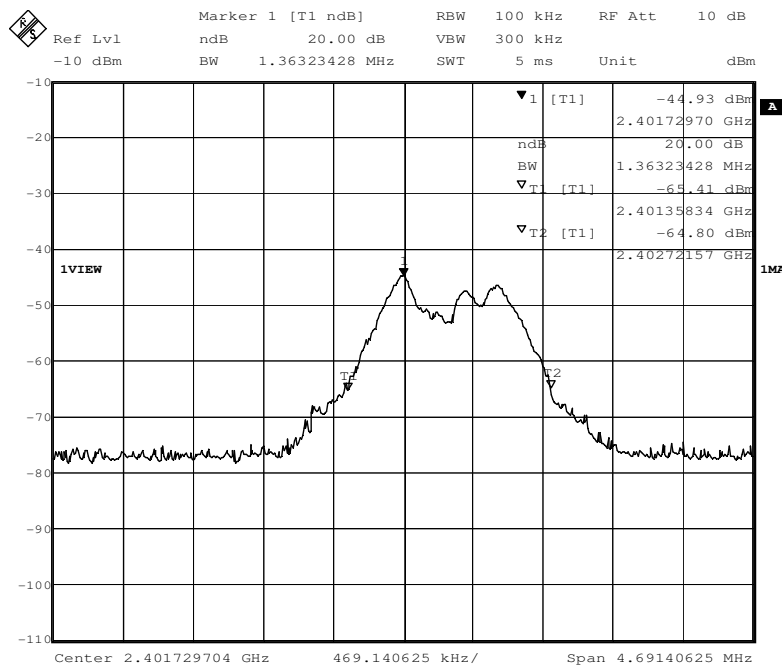
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Test Method: ANSI C63.10: Clause 6.9.1

Operation within the band 2.400 to 2.4835 GHz

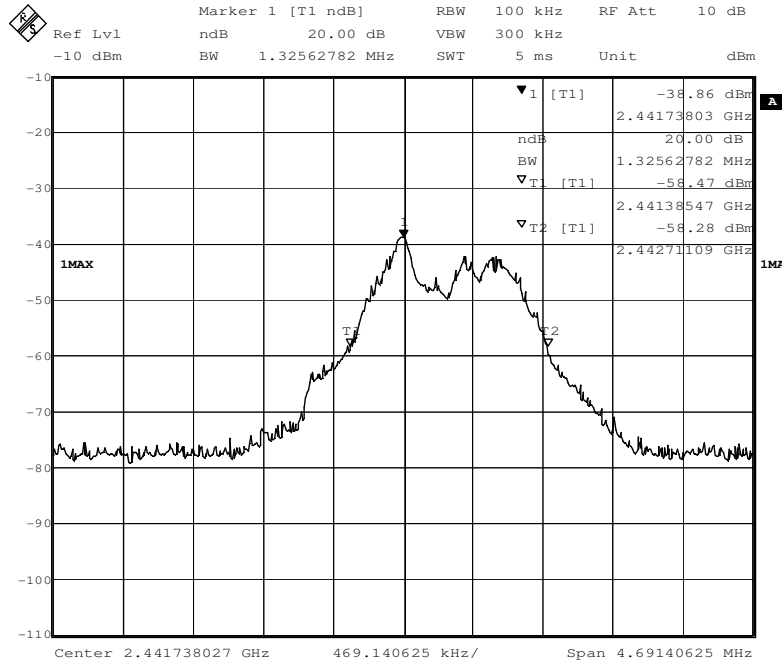
Method of measurement: A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken.

1. Test in the lowest frequency 2.402 GHz

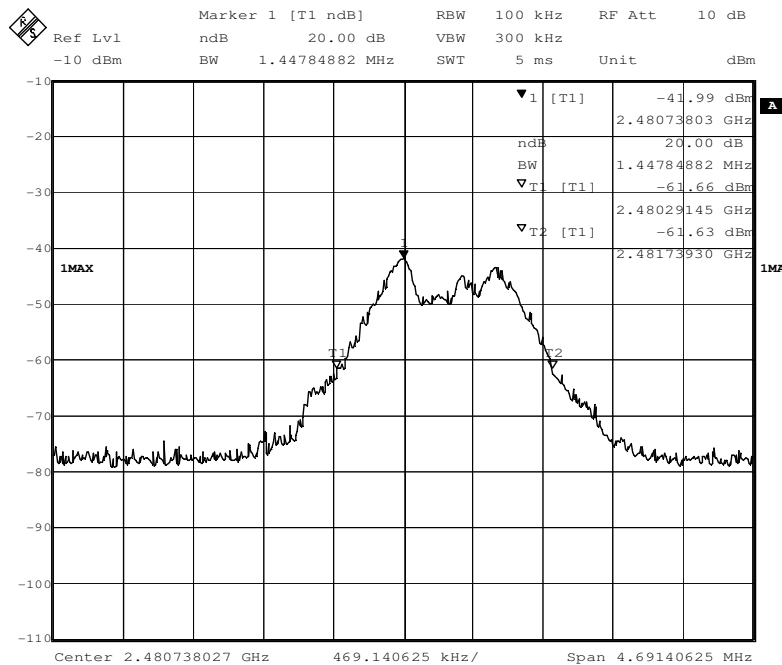




2. Test in the middle frequency 2.441 GHz



3. Test in the highest frequency 2.480 GHz



The results: The unit does meet the FCC requirements.

End of the report