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Report No.: GZEM130800378701
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FCC ID: O8520130908688

TEST REPORT

Application No.:	GZEM1308003787RF
Applicant:	SHANTOU CHENGHAI WEILI TOYS CO., LTD
FCC ID:	O8520130908688
Product Name:	Remote-control planes
Product Description:	Remote control plane with 2.4GHz as carrier
Model No.:	V757, V319, V388, V398, S977, S215, A638, A135, E728, E729, E777, E955, S929, E828, E838, V911, V911-1, V912, V913, V929, V939, V949, V959, V922, V933, V944, V955, V202, V212, V222 ♣
♣	Please refer to section 3 of this report for details
Standards:	47 CFR PART 15 Subpart C: 2012 section 15.249
Date of Receipt:	2013-08-14
Date of Test:	2013-09-04 to 2013-09-09
Date of Issue:	2013-09-13
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		2013-09-13		Original

Authorized for issue by:			
Tested By		(Fred Zhu) / Project Engineer	2013-09-04 to 2013-09-09 Date
Prepared By		(Millie Li) / Client	2013-09-13 Date
Checked By		(Jeffrey Chen) / Reviewer	2013-09-13 Date



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.:** V757, V319, V388, V398, S977, S215, A638, A135, E728, E729, E777, E955, S929, E828, E838, V911, V911-1, V912, V913, V929, V939, V949, V959, V922, V933, V944, V955, V202, V212, V222

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 model name and appearance.

Therefore only one item **V757** was tested in this report.



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5 General Information

5.1 Client Information

Applicant: SHANTOU CHENGHAI WEILI TOYS CO., LTD
Address of Applicant: NO.2 FENGXIN ROAD INDUSTRIAL AREA CHENGHAI SHANTOU
GUANGDONG CHINA

5.2 General Description of E.U.T.

Product Name: Remote-control planes
Model No.: V757

5.3 Details of E.U.T.

Operating Frequency: 2407 MHz to 2477MHz
Type of Modulation: FSK
Number of Channels: 71
Channel Separation: 1MHz
Antenna Type: Integral Antenna
Antenna gain: 2.0 dBi
Function: 2.4GHz is used for common channel for data transfer. Transmitter will be hopped between 2.407GHz and 2.477GHz for searching the Receiver. When the receiver is found, this frequency will be fixed and not be changed any more.
Power Supply: DC 9V Size "AA" batteries x 6
Power cord: N/A

5.4 Description of Support Units

The EUT has been test as an independent unit.

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	2016-08-31	3Y
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2016-08-31	3Y
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2014-06-02	2Y
EMC2026	Horn Antenna 1-18GHz	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	9120D-841	2016-08-31	3Y
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	2014-08-31	1Y
EMC2063	1-26GHz Pre Amplifier	Compliance Direction System Inc.	PAP-1G26-48	6279.628	2014-07-29	1Y
EMC0075	310N Amplifier	Sonama	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
EMC2069	2.4GHz filter	Micro-Tronics	BRM 50702	149	2014-06-05	1Y
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 9V by “AA” new batteries x 6
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:

Group 1	2407	2411	2415	2419	2423	2427	2431	2435
Group 2	2408	2412	2416	2420	2424	2428	2432	2436
Group 3	2409	2413	2417	2421	2425	2429	2433	2437
Group 4	2410	2414	2418	2422	2426	2430	2434	2438
Group 5	2411	2415	2419	2423	2427	2431	2435	2439
Group 6	2412	2416	2420	2424	2428	2432	2436	2440
Group 7	2413	2417	2421	2425	2429	2433	2437	2441
Group 8	2414	2418	2422	2426	2430	2434	2438	2442
Group 9	2415	2419	2423	2427	2431	2435	2439	2443
Group 10	2416	2420	2424	2428	2432	2436	2440	2444
Group 11	2417	2421	2425	2429	2433	2437	2441	2445
Group 12	2418	2422	2426	2430	2434	2438	2442	2446
Group 13	2419	2423	2427	2431	2435	2439	2443	2447
Group 14	2420	2424	2428	2432	2436	2440	2444	2448
Group 15	2421	2425	2429	2433	2437	2441	2445	2449
Group 16	2422	2426	2430	2434	2438	2442	2446	2450
Group 17	2423	2427	2431	2435	2439	2443	2447	2451
Group 18	2424	2428	2432	2436	2440	2444	2448	2452
Group 19	2425	2429	2433	2437	2441	2445	2449	2453
Group 20	2426	2430	2434	2438	2442	2446	2450	2454
Group 21	2427	2431	2435	2439	2443	2447	2451	2455
Group 22	2428	2432	2436	2440	2444	2448	2452	2456
Group 23	2429	2433	2437	2441	2445	2449	2453	2457
Group 24	2430	2434	2438	2442	2446	2450	2454	2458
Group 25	2431	2435	2439	2443	2447	2451	2455	2459
Group 26	2432	2436	2440	2444	2448	2452	2456	2460
Group 27	2407	2412	2417	2422	2427	2432	2437	2442
Group 28	2408	2413	2418	2423	2428	2433	2438	2443
Group 29	2409	2414	2419	2424	2429	2434	2439	2444
Group 30	2410	2415	2420	2425	2430	2435	2440	2445
Group 31	2411	2416	2421	2426	2431	2436	2441	2446
Group 32	2412	2417	2422	2427	2432	2437	2442	2447
Group 33	2413	2418	2423	2428	2433	2438	2443	2448
Group 34	2414	2419	2424	2429	2434	2439	2444	2449
Group 35	2415	2420	2425	2430	2435	2440	2445	2450
Group 36	2416	2421	2426	2431	2436	2441	2446	2451
Group 37	2417	2422	2427	2432	2437	2442	2447	2452
Group 38	2418	2423	2428	2433	2438	2443	2448	2453



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Group 39	2419	2424	2429	2434	2439	2444	2449	2454
Group 40	2420	2425	2430	2435	2440	2445	2450	2455
Group 41	2421	2426	2431	2436	2441	2446	2451	2456
Group 42	2422	2427	2432	2437	2442	2447	2452	2457
Group 43	2423	2428	2433	2438	2443	2448	2453	2458
Group 44	2424	2429	2434	2439	2444	2449	2454	2459
Group 45	2425	2430	2435	2440	2445	2450	2455	2460
Group 46	2426	2431	2436	2441	2446	2451	2456	2461
Group 47	2427	2432	2437	2442	2447	2452	2457	2462
Group 48	2428	2433	2438	2443	2448	2453	2458	2463
Group 49	2429	2434	2439	2444	2449	2454	2459	2464
Group 50	2430	2435	2440	2445	2450	2455	2460	2465
Group 51	2431	2436	2441	2446	2451	2456	2461	2466
Group 52	2432	2437	2442	2447	2452	2457	2462	2467
Group 53	2433	2438	2443	2448	2453	2458	2463	2468
Group 54	2434	2439	2444	2449	2454	2459	2464	2469
Group 55	2435	2440	2445	2450	2455	2460	2465	2470
Group 56	2436	2441	2446	2451	2456	2461	2466	2471
Group 57	2437	2442	2447	2452	2457	2462	2467	2472
Group 58	2438	2443	2448	2453	2458	2463	2468	2473
Group 59	2439	2444	2449	2454	2459	2464	2469	2474
Group 60	2440	2445	2450	2455	2460	2465	2470	2475
Group 61	2441	2446	2451	2456	2461	2466	2471	2476
Group 62	2442	2447	2452	2457	2462	2467	2472	2477
Group 63	2407	2413	2419	2425	2431	2437	2443	2449
Group 64	2408	2414	2420	2426	2432	2438	2444	2450
Group 65	2409	2415	2421	2427	2433	2439	2445	2451
Group 66	2410	2416	2422	2428	2434	2440	2446	2452
Group 67	2411	2417	2423	2429	2435	2441	2447	2453
Group 68	2412	2418	2424	2430	2436	2442	2448	2454
Group 69	2413	2419	2425	2431	2437	2443	2449	2455
Group 70	2414	2420	2426	2432	2438	2444	2450	2456
Group 71	2415	2421	2427	2433	2439	2445	2451	2457
Group 72	2416	2422	2428	2434	2440	2446	2452	2458
Group 73	2417	2423	2429	2435	2441	2447	2453	2459
Group 74	2418	2424	2430	2436	2442	2448	2454	2460
Group 75	2419	2425	2431	2437	2443	2449	2455	2461
Group 76	2420	2426	2432	2438	2444	2450	2456	2462
Group 77	2421	2427	2433	2439	2445	2451	2457	2463
Group 78	2422	2428	2434	2440	2446	2452	2458	2464
Group 79	2423	2429	2435	2441	2447	2453	2459	2465



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Group 80	2424	2430	2436	2442	2448	2454	2460	2466
Group 81	2425	2431	2437	2443	2449	2455	2461	2467
Group 82	2426	2432	2438	2444	2450	2456	2462	2468
Group 83	2427	2433	2439	2445	2451	2457	2463	2469
Group 84	2428	2434	2440	2446	2452	2458	2464	2470
Group 85	2429	2435	2441	2447	2453	2459	2465	2471
Group 86	2430	2436	2442	2448	2454	2460	2466	2472
Group 87	2431	2437	2443	2449	2455	2461	2467	2473
Group 88	2432	2438	2444	2450	2456	2462	2468	2474
Group 89	2433	2439	2445	2451	2457	2463	2469	2475
Group 90	2434	2440	2446	2452	2458	2464	2470	2476
Group 91	2435	2441	2447	2453	2459	2465	2471	2477
Group 92	2407	2414	2421	2428	2435	2442	2449	2456
Group 93	2408	2415	2422	2429	2436	2443	2450	2457
Group 94	2409	2416	2423	2430	2437	2444	2451	2458
Group 95	2410	2417	2424	2431	2438	2445	2452	2459
Group 96	2411	2418	2425	2432	2439	2446	2453	2460
Group 97	2412	2419	2426	2433	2440	2447	2454	2461
Group 98	2413	2420	2427	2434	2441	2448	2455	2462
Group 99	2414	2421	2428	2435	2442	2449	2456	2463
Group 100	2415	2422	2429	2436	2443	2450	2457	2464
Group 101	2416	2423	2430	2437	2444	2451	2458	2465
Group 102	2417	2424	2431	2438	2445	2452	2459	2466
Group 103	2418	2425	2432	2439	2446	2453	2460	2467
Group 104	2419	2426	2433	2440	2447	2454	2461	2468
Group 105	2420	2427	2434	2441	2448	2455	2462	2469
Group 106	2421	2428	2435	2442	2449	2456	2463	2470
Group 107	2422	2429	2436	2443	2450	2457	2464	2471
Group 108	2423	2430	2437	2444	2451	2458	2465	2472
Group 109	2424	2431	2438	2445	2452	2459	2466	2473
Group 110	2425	2432	2439	2446	2453	2460	2467	2474
Group 111	2426	2433	2440	2447	2454	2461	2468	2475
Group 112	2427	2434	2441	2448	2455	2462	2469	2476
Group 113	2428	2435	2442	2449	2456	2463	2470	2477
Group 114	2407	2415	2423	2431	2439	2447	2455	2463
Group 115	2408	2416	2424	2432	2440	2448	2456	2464
Group 116	2409	2417	2425	2433	2441	2449	2457	2465
Group 117	2410	2418	2426	2434	2442	2450	2458	2466
Group 118	2411	2419	2427	2435	2443	2451	2459	2467
Group 119	2412	2420	2428	2436	2444	2452	2460	2468
Group 120	2413	2421	2429	2437	2445	2453	2461	2469



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Group 121	2414	2422	2430	2438	2446	2454	2462	2470
Group 122	2415	2423	2431	2439	2447	2455	2463	2471
Group 123	2416	2424	2432	2440	2448	2456	2464	2472
Group 124	2417	2425	2433	2441	2449	2457	2465	2473
Group 125	2418	2426	2434	2442	2450	2458	2466	2474
Group 126	2419	2427	2435	2443	2451	2459	2467	2475
Group 127	2420	2428	2436	2444	2452	2460	2468	2476
Group 128	2421	2429	2437	2445	2453	2461	2469	2477

Test frequencies are the lowest channel: Group 1 (2407 MHz), middle channel: Group125 (2442 MHz) and highest channel: Group 128 (2477 MHz)

7.2 Antenna Requirement

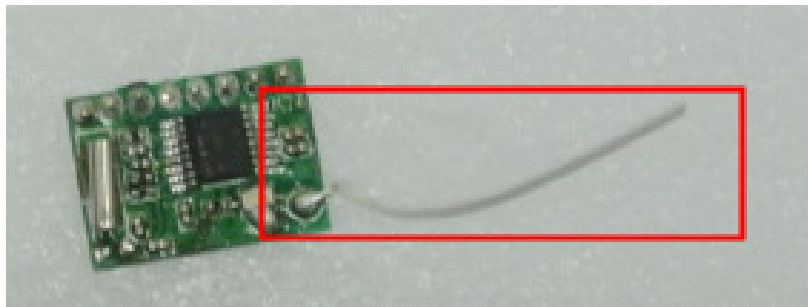
Standard requirement

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 Integral Antenna integrated 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 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 2407MHz ~ 2477MHz.

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.

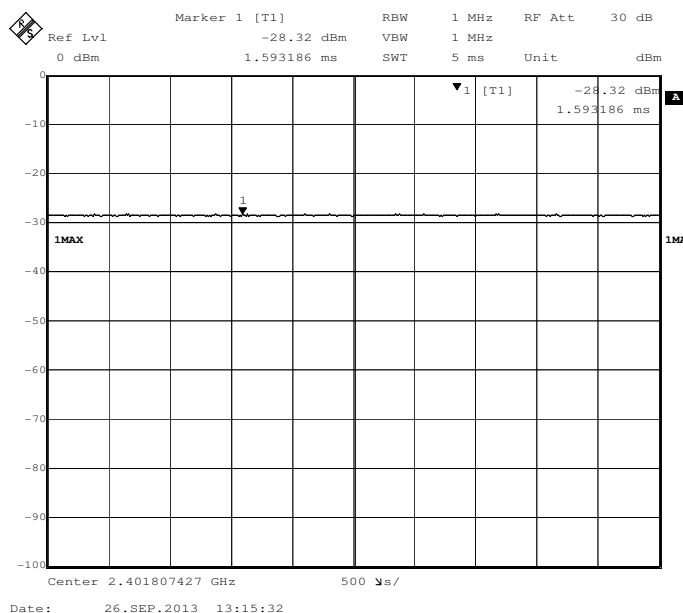
3)1 GHz to 25 GHz emissions:

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.

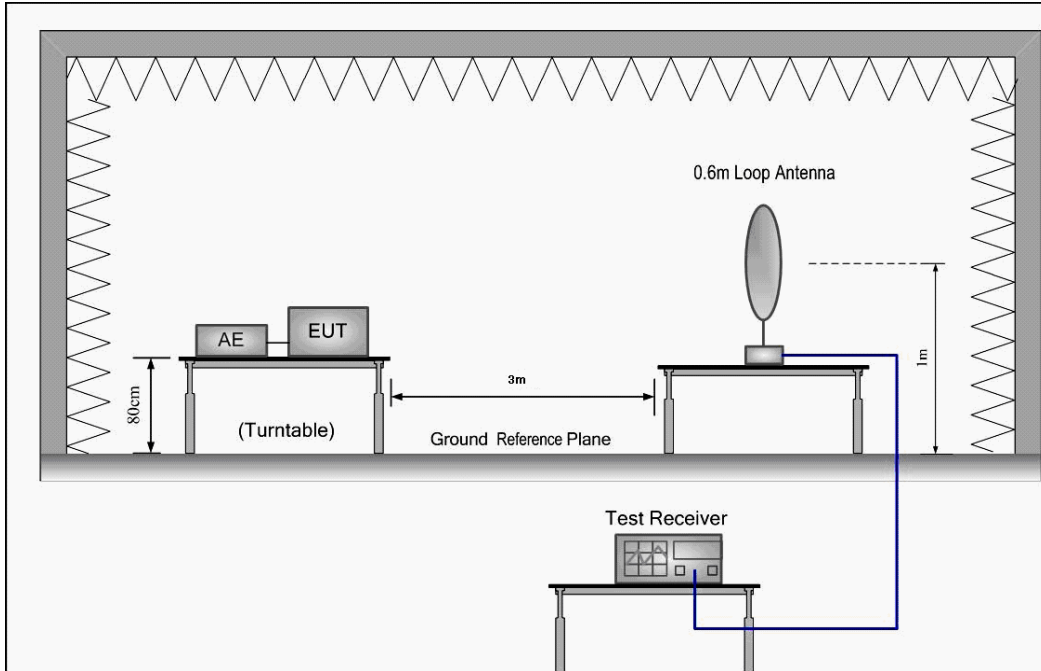
When the duty cycle equal 100 percents, the method of RBW=1MHz and VBW=10Hz to test AV value will be used.

The plot of duty cycle as follow:

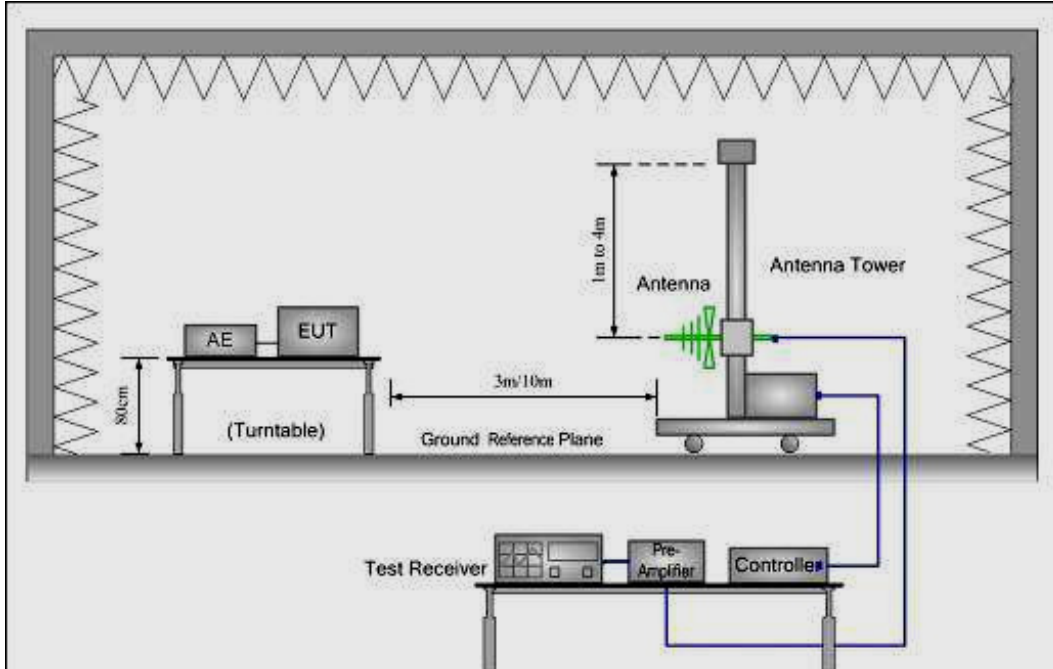


Test Configuration:

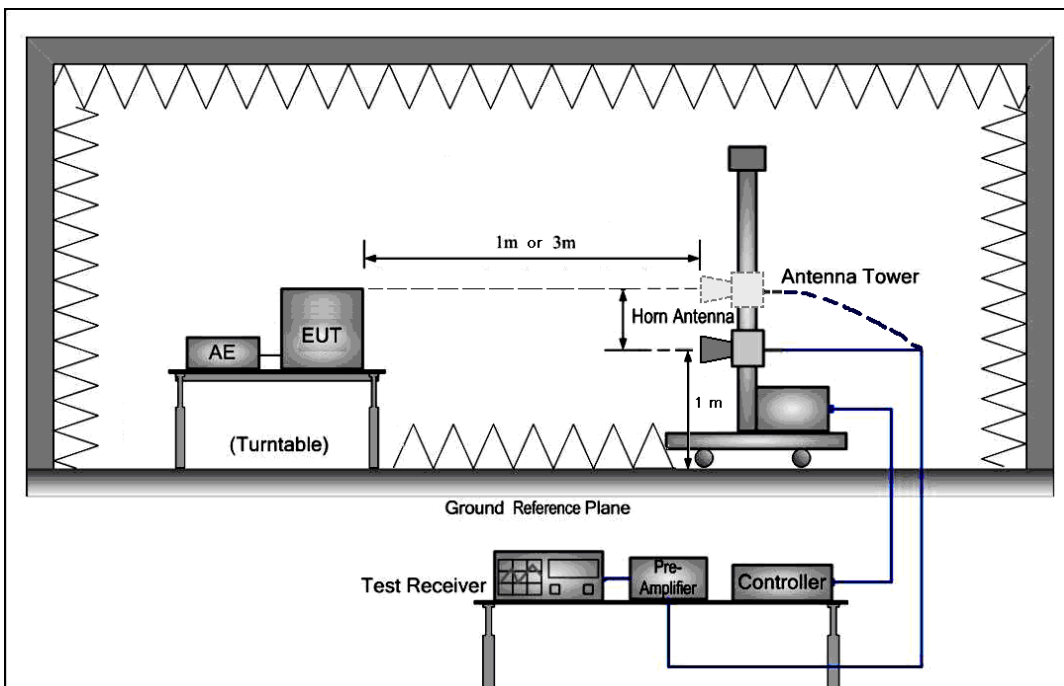
- 1) 9 kHz to 30 MHz emissions:



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

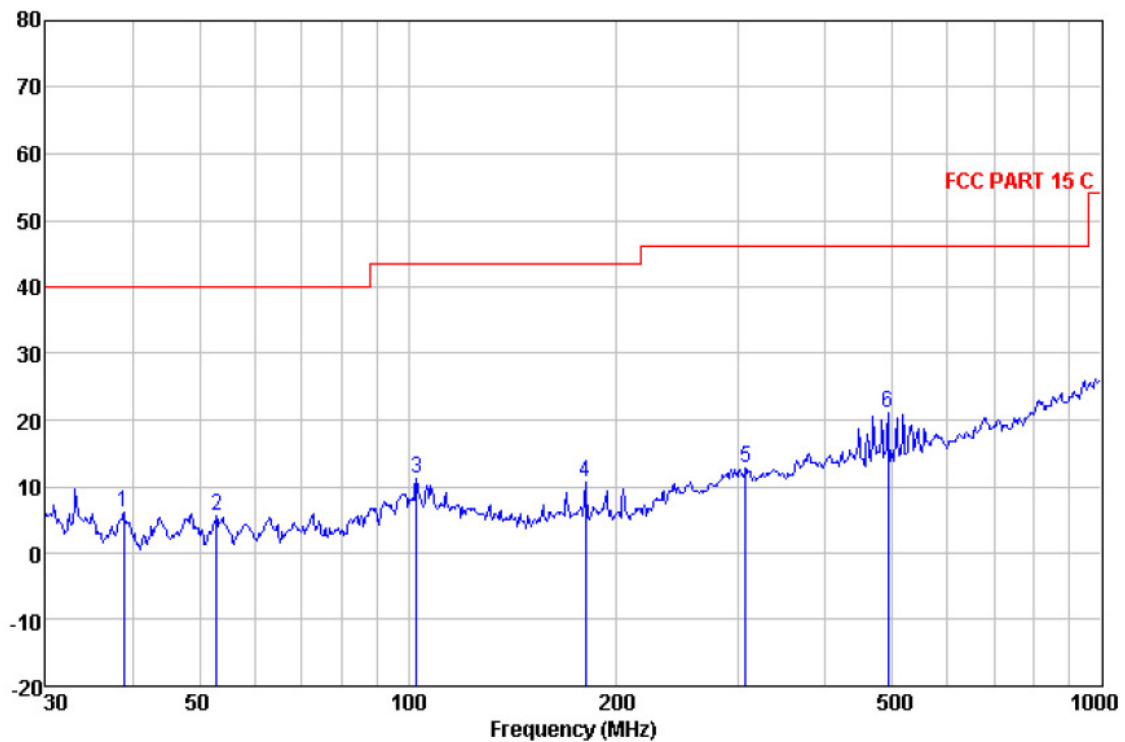
The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

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

Vertical:

Peak scan

Level (dB μ V/m)



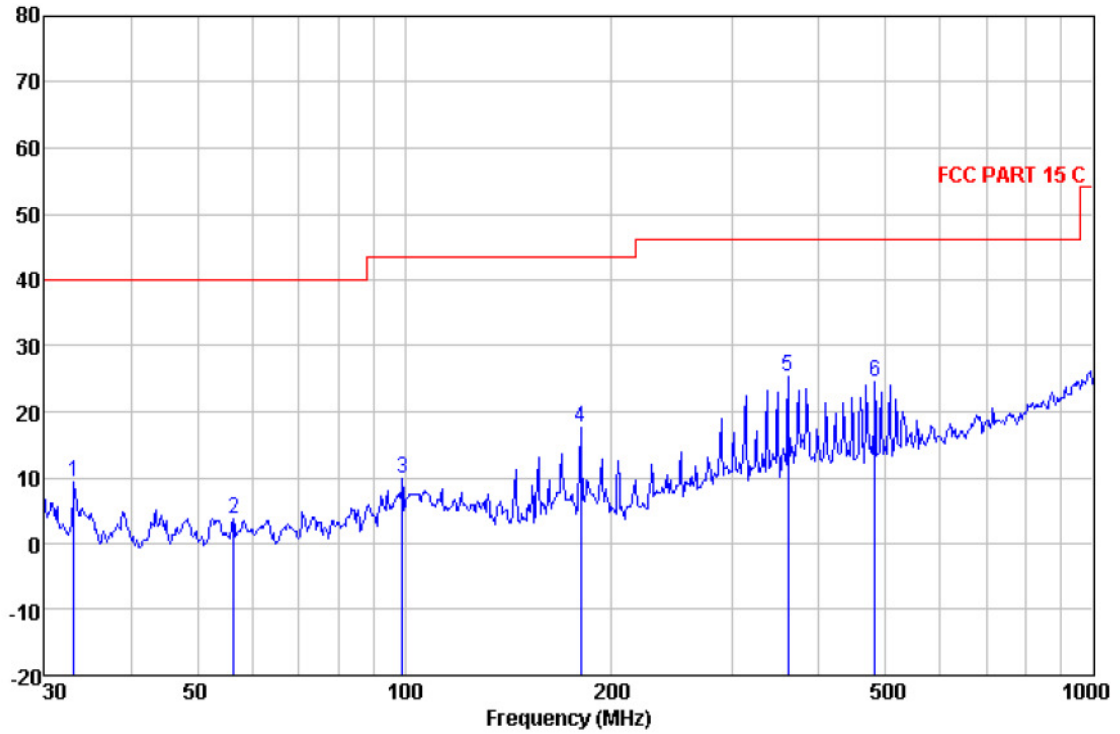
Quasi-peak measurement

Freq	ReadAntenna	Cable	Preamp	Limit	Over	Remark
MHz	Level	Factor	Loss	Line	Limit	
	dB μ V	dB/m	dB	dB	dB μ V/m	dB
38.888	17.76	14.90	0.20	26.77	6.09	40.00 -33.91 QP
52.945	27.78	4.40	0.08	26.70	5.56	40.00 -34.44 QP
102.719	26.43	11.26	0.22	26.58	11.33	43.50 -32.17 QP
180.017	28.56	7.60	0.65	26.19	10.62	43.50 -32.88 QP
306.754	24.59	13.00	1.01	25.84	12.76	46.00 -33.24 QP
492.469	29.02	17.38	1.56	27.00	20.96	46.00 -25.04 QP



Horizontal:

Peak scan
 Level (dB μ V/m)



Quasi-peak measurement

Freq	ReadAntenna Level	Cable Antenna Factor	Preamp Loss	Preamp Factor	Limit Level	Over Limit	Remark
MHz	dB μ V	dB/m	dB	dB	dB μ V/m	dB μ V/m	dB
33.095	17.68	18.39	0.07	26.80	9.34	40.00	-30.66 QP
56.395	25.76	4.62	0.15	26.69	3.84	40.00	-36.16 QP
99.180	25.58	10.66	0.21	26.58	9.87	43.50	-33.63 QP
180.017	35.55	7.60	0.65	26.19	17.61	43.50	-25.89 QP
360.448	35.46	14.70	1.20	26.12	25.24	46.00	-20.76 QP
482.216	32.68	17.32	1.51	26.98	24.53	46.00	-21.47 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
2407.00	27.58	6.17	49.43	98.02	82.34	114.00	V
4814.00	31.54	8.81	49.30	54.31	45.36	74.00	V
7221.00	36.48	12.32	49.73	55.70	54.77	74.00	V
9628.00	38.14	16.00	49.89	54.46	58.71	74.00	V
2407.00	27.58	6.17	49.43	96.14	80.46	114.00	H
4814.00	31.54	8.81	49.30	58.93	49.98	74.00	H
7221.00	36.48	12.32	49.73	56.74	55.81	74.00	H
9628.00	38.14	16.00	49.89	55.14	59.39	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
2407.00	27.58	6.17	49.43	92.02	76.34	94.00	V
4814.00	31.54	8.81	49.30	58.47	49.52	54.00	V
7221.00	36.48	12.32	49.73	48.70	47.77	54.00	V
9628.00	38.14	16.00	49.89	45.46	49.71	54.00	V
2407.00	27.58	6.17	49.43	89.14	73.46	94.00	H
4814.00	31.54	8.81	49.30	52.93	43.98	54.00	H
7221.00	36.48	12.32	49.73	49.74	48.81	54.00	H
9628.00	38.14	16.00	49.89	46.14	50.39	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	49.43	55.44	39.73	74.00	V
2483.50	27.55	6.30	49.41	55.78	40.22	74.00	V
2400.00	27.58	6.14	49.43	53.75	38.04	74.00	H
2483.50	27.55	6.30	49.41	55.36	39.80	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	49.43	51.44	35.73	54.00	V
2483.50	27.55	6.30	49.41	50.78	35.22	54.00	V
2400.00	27.58	6.14	49.43	50.75	35.04	54.00	H
2483.50	27.55	6.30	49.41	48.36	32.80	54.00	H



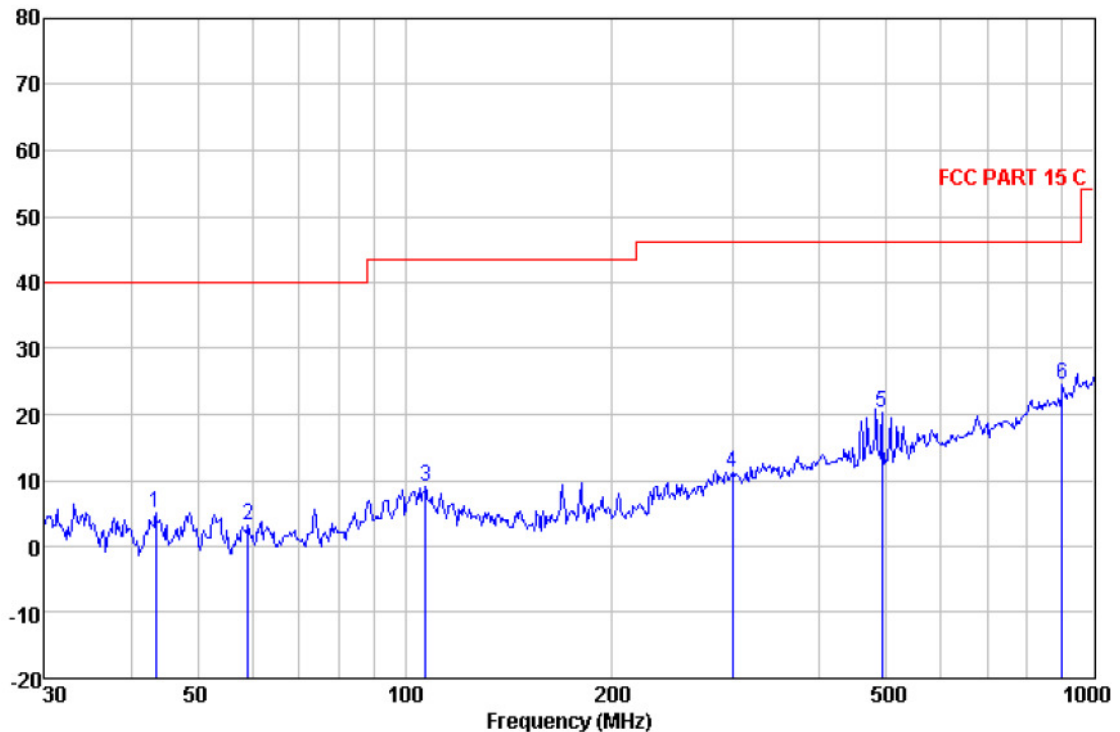
Test at middle Channel in transmitting status

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)



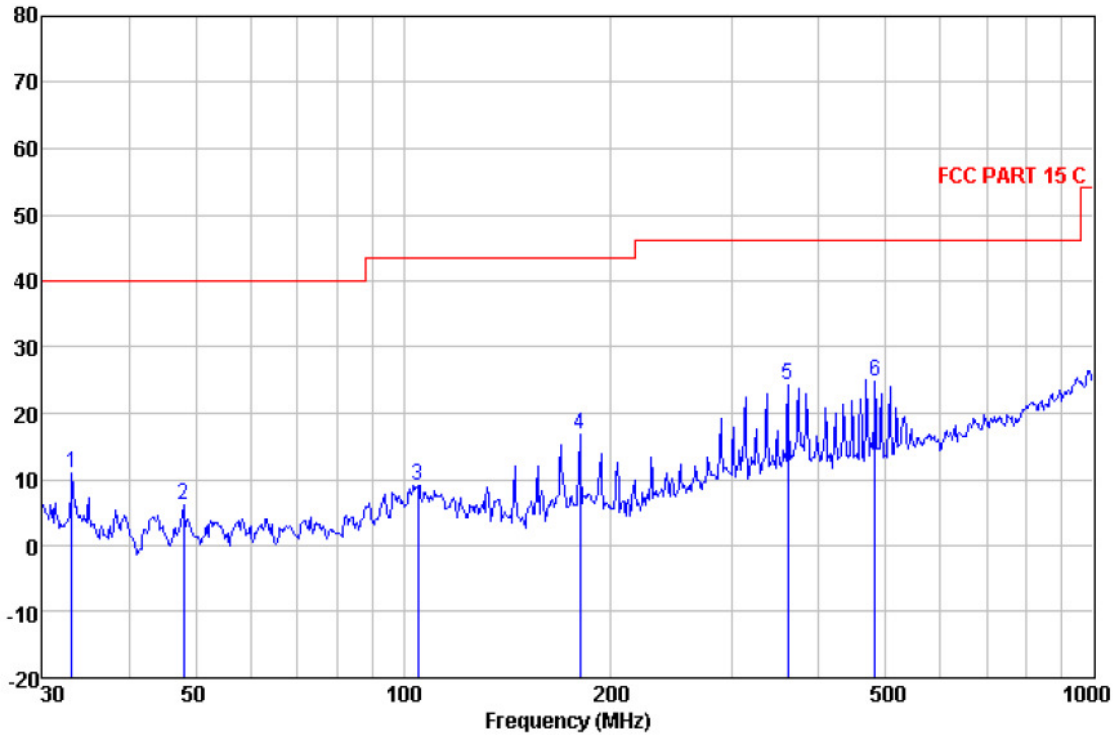
Quasi-peak measurement

Freq	ReadAntenna	Cable	Preamp	Limit	Over	Remark
MHz	Level	Factor	Loss	Line	Limit	
	dB μ V	dB/m	dB	dB	dB μ V/m	dB
43.506	19.89	11.70	0.16	26.75	5.00	40.00 -35.00 QP
59.232	24.85	4.82	0.21	26.68	3.20	40.00 -36.80 QP
107.134	23.60	11.73	0.23	26.56	9.00	43.50 -34.50 QP
298.268	23.56	12.60	0.99	25.82	11.33	46.00 -34.67 QP
492.469	28.23	17.38	1.56	27.00	20.17	46.00 -25.83 QP
900.147	28.61	20.70	1.93	26.78	24.46	46.00 -21.54 QP



Horizontal:

Peak scan
 Level (dB μ V/m)



Quasi-peak measurement

Freq	ReadAntenna	Cable	Preamp	Limit	Over	Remark		
MHz	Level	Factor	Loss	Factor	Level	Line	Limit	dB
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
33.095	19.37	18.39	0.07	26.80	11.03	40.00	-28.97	QP
47.994	24.83	7.90	0.06	26.72	6.07	40.00	-33.93	QP
104.903	23.87	11.60	0.23	26.57	9.13	43.50	-34.37	QP
180.017	34.85	7.60	0.65	26.19	16.91	43.50	-26.59	QP
360.448	34.43	14.70	1.20	26.12	24.21	46.00	-21.79	QP
482.216	32.91	17.32	1.51	26.98	24.76	46.00	-21.24	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
2442.00	27.57	6.24	49.42	99.56	83.95	114.00	V
4884.00	31.58	8.63	49.30	57.44	48.35	74.00	V
7326.00	36.51	12.23	49.74	56.41	55.41	74.00	V
9768.00	38.51	15.70	49.89	55.15	59.47	74.00	V
2442.00	27.57	6.24	49.42	97.74	82.13	114.00	H
4884.00	31.58	8.63	49.30	58.03	48.94	74.00	H
7326.00	36.51	12.23	49.74	56.82	55.82	74.00	H
9768.00	38.51	15.70	49.89	54.91	59.23	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
2442.00	27.57	6.24	49.42	88.56	72.95	94.00	V
4884.00	31.58	8.63	49.30	50.44	41.35	54.00	V
7326.00	36.51	12.23	49.74	48.41	47.41	54.00	V
9768.00	38.51	15.70	49.89	46.15	50.47	54.00	V
2442.00	27.57	6.24	49.42	89.74	74.13	94.00	H
4884.00	31.58	8.63	49.30	51.03	41.94	54.00	H
7326.00	36.51	12.23	49.74	48.82	47.82	54.00	H
9768.00	38.51	15.70	49.89	45.91	50.23	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	49.43	55.80	40.09	74.00	V
2483.50	27.55	6.30	49.41	55.78	40.22	74.00	V
2400.00	27.58	6.14	49.43	54.20	38.49	74.00	H
2483.50	27.55	6.30	49.41	55.94	40.38	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	49.43	51.80	36.09	54.00	V
2483.50	27.55	6.30	49.41	51.78	36.22	54.00	V
2400.00	27.58	6.14	49.43	50.20	34.49	54.00	H
2483.50	27.55	6.30	49.41	50.94	35.38	54.00	H

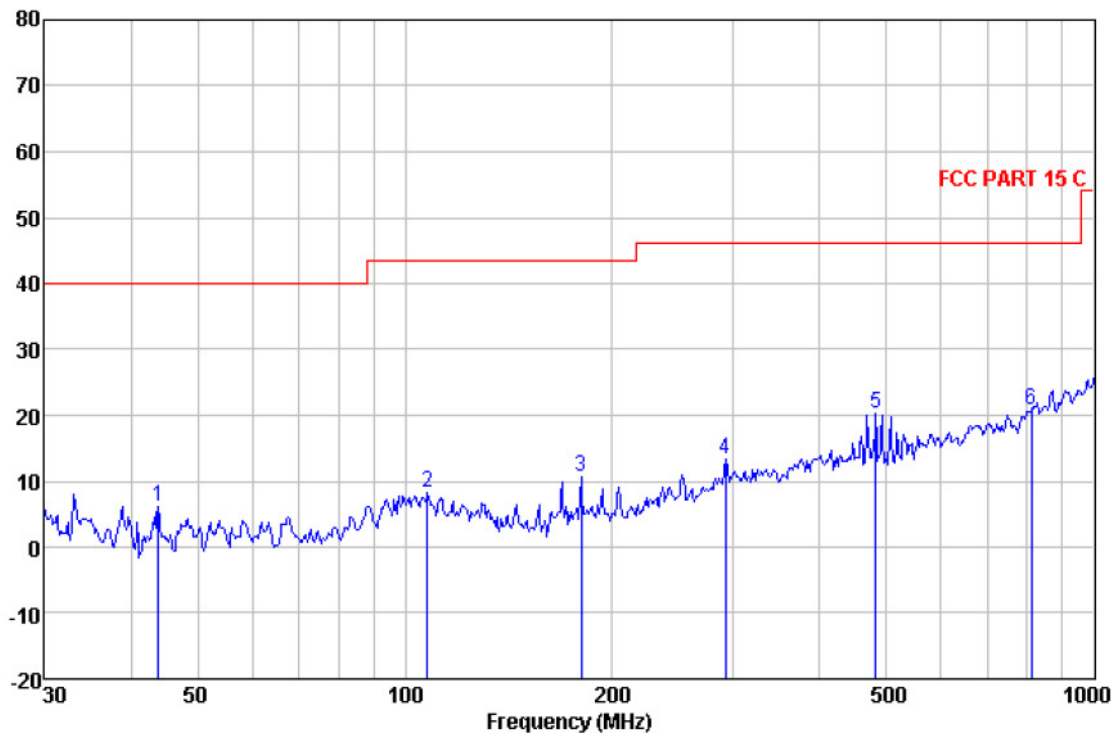
Test at high Channel in transmitting status

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)

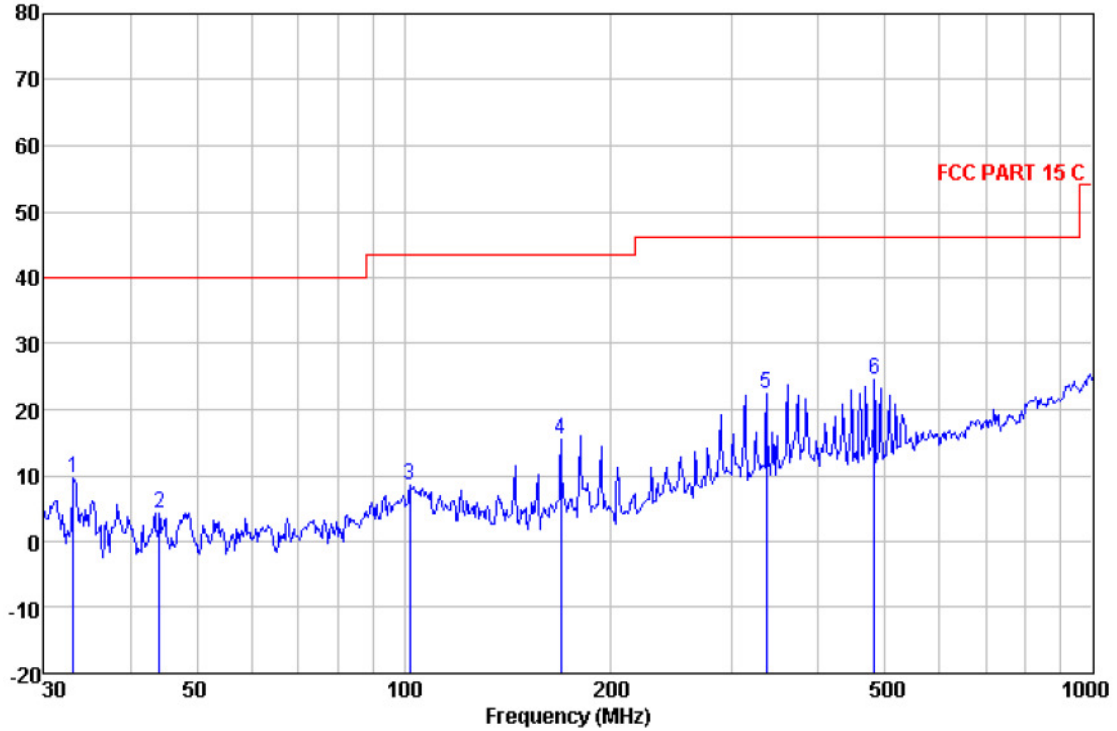


Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Limit Line	Over Limit	Remark
MHz	dBμV	dB/m	dB	dB	dBμV/m	dBμV/m	dB	
43.812	21.23	11.50	0.16	26.75	6.14	40.00	-33.86	QP
107.888	22.72	11.77	0.24	26.56	8.17	43.50	-35.33	QP
180.017	28.72	7.60	0.65	26.19	10.78	43.50	-32.72	QP
292.058	25.43	12.66	0.97	25.84	13.22	46.00	-32.78	QP
482.216	28.32	17.32	1.51	26.98	20.17	46.00	-25.83	QP
810.265	25.77	20.20	1.75	27.03	20.69	46.00	-25.31	QP

Horizontal:

Peak scan
 Level (dBµV/m)



Quasi-peak measurement

Freq	ReadAntenna	Cable	Preamp	Limit	Over	Remark
MHz	Level	Factor	Loss	Line	Limit	
	dBuV	dB/m	dB	dB	dBuV/m	dB
33.095	17.94	18.39	0.07	26.80	9.60	40.00 -30.40 QP
44.120	19.74	11.26	0.14	26.75	4.39	40.00 -35.61 QP
102.001	23.68	11.14	0.22	26.58	8.46	43.50 -35.04 QP
169.005	32.52	8.67	0.57	26.28	15.48	43.50 -28.02 QP
336.035	33.57	13.82	1.15	26.01	22.53	46.00 -23.47 QP
482.216	32.76	17.32	1.51	26.98	24.61	46.00 -21.39 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
2477.00	27.56	6.27	49.41	98.53	82.95	114.00	V
4954.00	31.68	8.28	49.30	58.56	49.22	74.00	V
7431.00	36.57	12.14	49.75	56.98	55.94	74.00	V
9908.00	38.68	15.10	49.90	55.20	59.08	74.00	V
2477.00	27.56	6.27	49.41	100.15	84.57	114.00	H
4954.00	31.68	8.28	49.30	58.05	48.71	74.00	H
7431.00	36.57	12.14	49.75	56.67	55.63	74.00	H
9908.00	38.68	15.10	49.90	54.01	57.89	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
2477.00	27.56	6.27	49.41	90.53	74.95	94.00	V
4954.00	31.68	8.28	49.30	50.56	41.22	54.00	V
7431.00	36.57	12.14	49.75	47.98	46.94	54.00	V
9908.00	38.68	15.10	49.90	46.20	50.08	54.00	V
2477.00	27.56	6.27	49.41	93.15	77.57	94.00	H
4954.00	31.68	8.28	49.30	51.05	41.71	54.00	H
7431.00	36.57	12.14	49.75	49.67	48.63	54.00	H
9908.00	38.68	15.10	49.90	46.01	49.89	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	49.43	49.90	34.19	74.00	V
2483.50	27.55	6.30	49.41	55.81	40.25	74.00	V
2400.00	27.58	6.14	49.43	55.15	39.44	74.00	H
2483.50	27.55	6.30	49.41	55.40	39.84	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	49.43	50.90	35.19	54.00	V
2483.50	27.55	6.30	49.41	50.81	35.25	54.00	V
2400.00	27.58	6.14	49.43	50.15	34.44	54.00	H
2483.50	27.55	6.30	49.41	49.40	33.84	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.

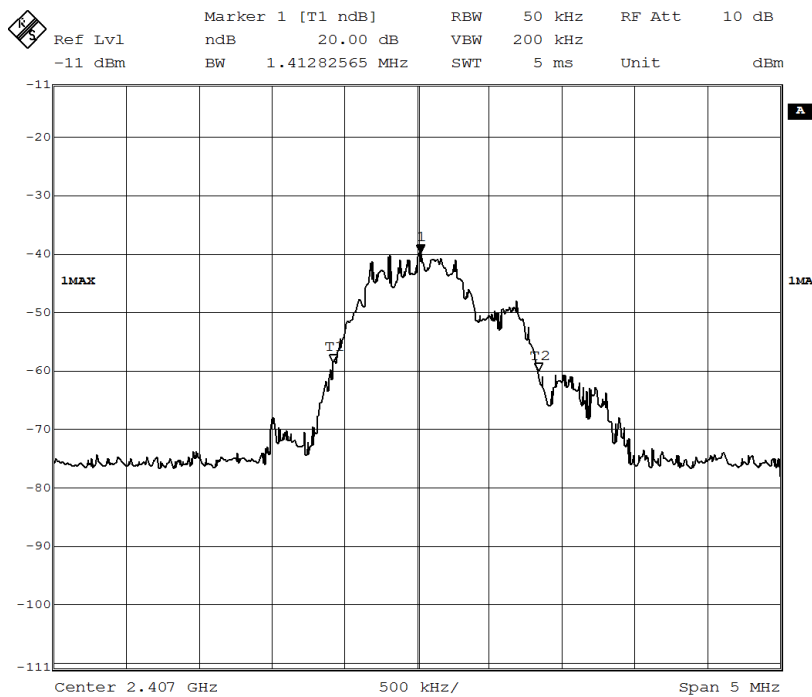
7.4 Occupied Bandwidth

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

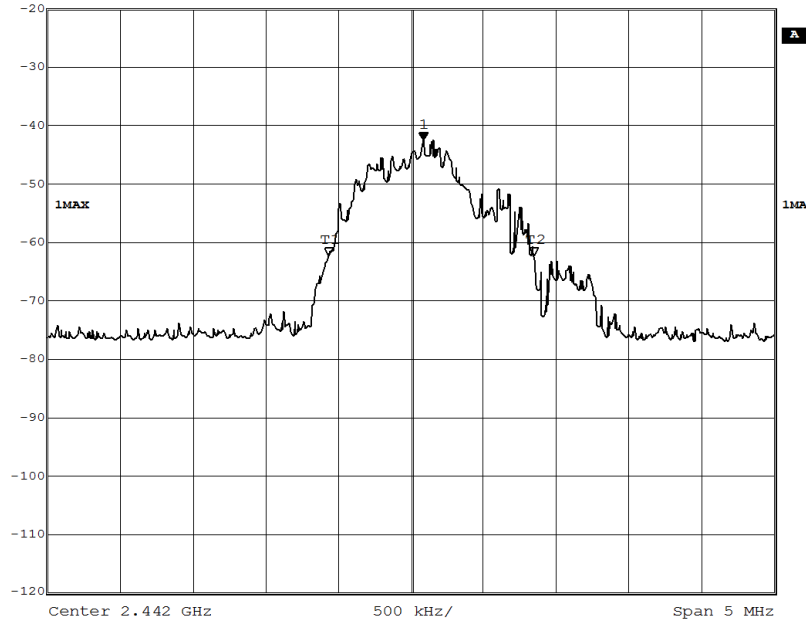
Method of measurement: A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken.

1. Test in the lowest frequency 2.407 GHz




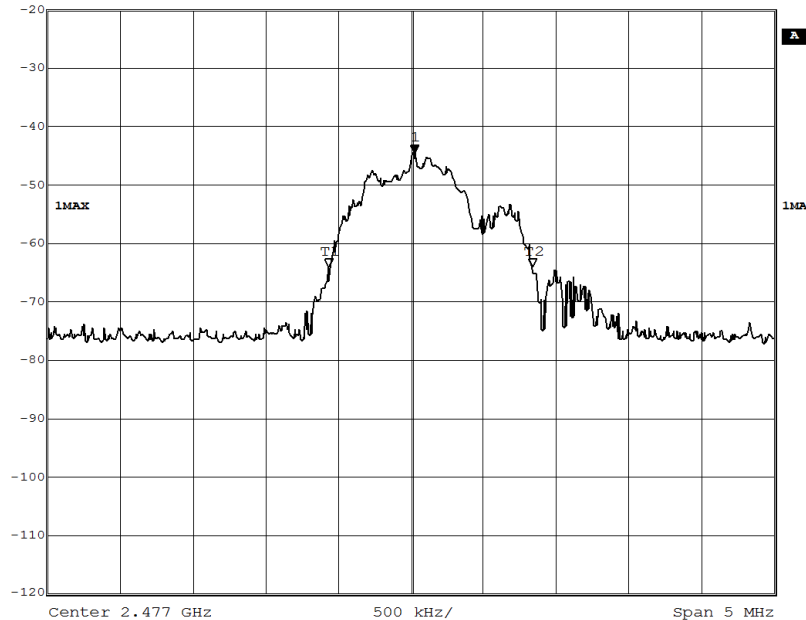
2. Test in the middle frequency 2.442 GHz

	Marker 1 [T1 ndB]	RBW	50 kHz	RF Att	10 dB	
	Ref Lvl	ndB	20.00 dB	VBW	200 kHz	
	-20 dBm	BW	1.41282565 MHz	SWT	5 ms	Unit



3. Test in the highest frequency 2.477 GHz

	Marker 1 [T1 ndB]	RBW	50 kHz	RF Att	10 dB	
	Ref Lvl	ndB	20.00 dB	VBW	200 kHz	
	-20 dBm	BW	1.40280561 MHz	SWT	5 ms	Unit



The results: The unit does meet the FCC requirements.

--End of the report--