



SGS-CSTC Standards Technical Services Co., Ltd.


198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technological
Development District, Guangzhou, China 510663
Telephone: +86 (0) 20 82155555
Fax: +86 (0) 20 82075059
Email: sgs_internet_operations@sgs.com
FEDERAL COMMUNICATIONS COMMISSION
Registration number: 282399

Report No.: GZEM1012001322401
Page: 1 of 22
FCC ID: ON5CY300

TEST REPORT

Application No.:	GZEM1012003224RF
Applicant:	CATEYE Co., Ltd.
Equipment Under Test (EUT):	
Product Name:	Watch Transceiver
Product Description:	Multi-Sport Computer
Model No.:	MSC-CY300
Trade Mark:	CATEYE
FCC ID:	ON5CY300
Standards:	FCC PART 15 Subpart C: 2009
Date of Receipt:	2010-12-27
Date of Test:	2011-01-27 to 2011-01-31
Date of Issue:	2011-04-08
Test Result :	Pass*

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


2011 Apr.

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.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2011-04-08		Original

Authorized for issue by:			
Tested By		2011-01-27 to 2011-01-31	Date
	Little Xiang / Project Engineer		
Prepared By		2011-03-22	Date
	Little Xiang / Project Engineer		
Checked By		2011-04-08	Date
	Strong Yao / Reviewer		



3 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Field Strength of Fundamental	FCC PART 15:2009	Section 15.249 (a)	PASS
Field Strength of Unwanted Emissions	FCC PART 15:2009	Section 15.249 (a) Section 15.249 (d)	PASS
Occupied Bandwidth	FCC PART 15:2009	Section 15.215(c)	PASS
Band Edges	FCC PART 15:2009	Section 15.249 (d)	PASS
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 Radiated Frequency.			



4 Contents

1 COVER PAGE 1

2 VERSION..... 2

3 TEST SUMMARY 3

4 CONTENTS..... 4

5 GENERAL INFORMATION 5

 5.1 Client Information 5

 5.2 General Description of E.U.T..... 5

 5.3 Details of E.U.T..... 5

 5.4 Description of Support Units 5

 5.5 Standards Applicable for Testing 5

 5.6 Test Location 6

6 EQUIPMENT USED DURING TEST 7

7 TEST RESULTS 8

 7.1 E.U.T. Operation..... 8

 7.2 Antenna Requirement 9

 7.2.1 Standard requirement..... 9

 7.3 Test Procedure & Measurement Data 10

 7.3.1 Field Strength of Fundamental & Field Strength of Unwanted Emissions..... 10

 7.3.2 Occupied Bandwidth & Band Edge 17



5 General Information

5.1 Client Information

Applicant: CATEYE Co., Ltd.
Address of Applicant: 2-8-25 Kuwazu, Higashi-Sumiyoshi-ku, Osaka Japan
Manufacturer: National Electronics & Watch Co., Ltd.
Address of Manufacturer: 15/F., SHING DAO IND. BLDG., 232 ABERDEEN MAIN ROAD, ABERDEEN, HONG KONG

5.2 General Description of E.U.T

Product Name: Watch Transceiver
Model No.: MSC-CY300
Trade Mark: CATEYE
Operating Frequency: 2.41GHz to 2.47GHz
Modulation Type: GFSK
Channel Number: 61
Channel Separation: 1MHz
Antenna Gain: 0dBi
Antenna Type: PCB
Function: 2.41GHz is used for common channel for data transfer. Transmitter will be hopped between 2.41GHz and 2.47GHz for searching the Receiver. When the receiver is found, this frequency will be fixed and not be changed any more.

5.3 Details of E.U.T

Power Supply: DC 3.0V Lithium Battery CR2430
Power Cord: N/A

5.4 Description of Support Units

NA

5.5 Standards Applicable for Testing

The customer requested FCC tests for the EUT.

The standard used was FCC PART 15, SUBPART C (2009) section 15.249.

5.6 Other Information Requested by the Customer

None.



5.7 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.

- **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.

5.6 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 (YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	2011-09-06
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2012-01-17
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	10036	2011-06-02
N/A	EMI Test Software	Audix	E3	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	2011-12-08
EMC2025	Trilog Broadband Antenna 30-3000MHz	SCHWARZBECK MESS- ELEKTRONIK	VULB 9163	9163-450	2011-10-28
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2011-12-20
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2011-12-20
EMC0518	Horn Antenna	Rohde & Schwarz	HF906	100096	2011-09-11
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2012-01-17
EMC0049	Amplifier	Agilent	8447D	2944A10862	2012-04-21
EMC0075	310N Amplifier	Sonoma	310N	272683	2011-10-25
EMC0523	Active Loop Antenna	EMCO	6502	42963	2011-11-17
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	2012-05-17

General used equipment					
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Due date (YYYY-MM-DD)
EMC0006	DMM	Fluke	73	70681569	2011-12-16
EMC0007	DMM	Fluke	73	70671122	2011-12-16



7 Test Results

7.1 E.U.T. Operation

Input voltage: DC 3.0V Lithium Battery CR2430

Operating Environment: Normal

Temperature: 25°C

Humidity: 50% RH

Atmospheric Pressure: 1006mbar

Test frequencies: 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:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 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

Since the carriers of the EUT are 2410~2470MHz and the alignment range of the transmitter is More than 10 MHz. So full test is carried out on the lowest frequency: (2410 MHz), and middle frequency: (2445MHz), the highest frequency: (2470MHz)

7.2 Antenna Requirement

7.2.1 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.



Note: No antenna other than the product has by the manufacturer can be used with the device, so the product meets the Antenna Requirement.



7.3 Test Procedure & Measurement Data

7.3.1 Field Strength of Fundamental & Field Strength of Unwanted Emissions

Test Requirement: FCC Part15 C Section 15.249(a) & (d)

Test Method: Based on FCC Part15 C Section 15.249 & ANSI C63.4:2003

Test Date: 2011-01-27

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 – 26GHz for transmitting mode.
Test instrumentation resolution bandwidth
120 kHz (30 MHz - 1000 MHz), 1 MHz (1000 MHz – 26GHz)

Operation: Receive antenna scan height 1 - 4 m, polarization Vertical/ Horizontal, a turntable rotate through 360° in the horizontal plane and it is used to support the test sample at 0.8m above the ground plane.

Requirements:

FCC Part 15.249(a)

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m @ 3m)	Field Strength of Harmonics (dBuV/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

FCC Part 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.

Remark:

The fundamental frequency rang is in the frequency band of the EUT is 2410MHz ~ 2470MHz.

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

No fundamental is allowed in the restricted bands.

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

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

Test Procedure:

1)9K to 30MHz emissions:

For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.4:2003 section 8.2.1. 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)30MHz to 1GHz emissions:

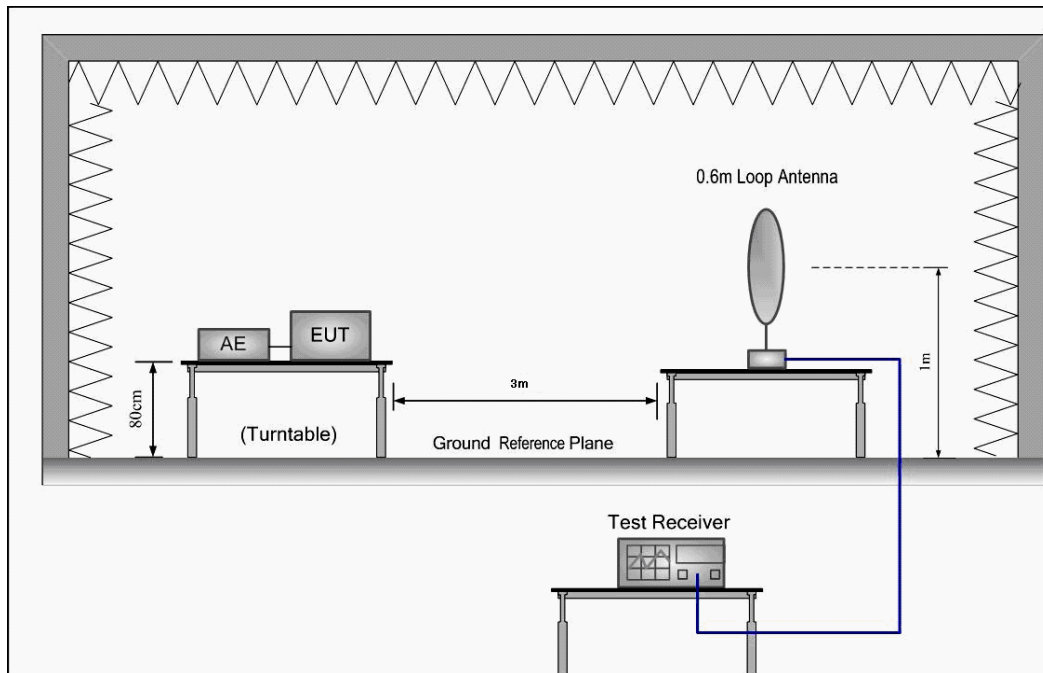
For testing performed with the bi-log type antenna, testing was performed in accordance to ANSI C63.4:2003. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

3)1GHz to 40GHz emissions:

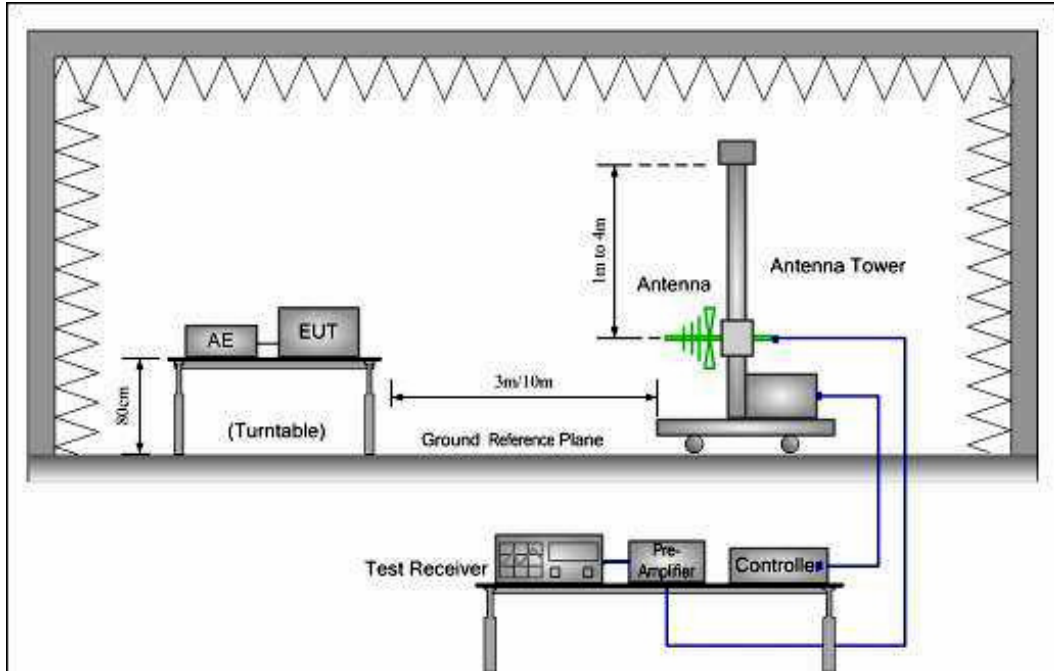
For testing performed with the horn antenna, testing was performed in accordance to ANSI C63.4:2003. The measurement is performed with the EUT rotated 360°, the antenna height scan between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

Test Configuration:

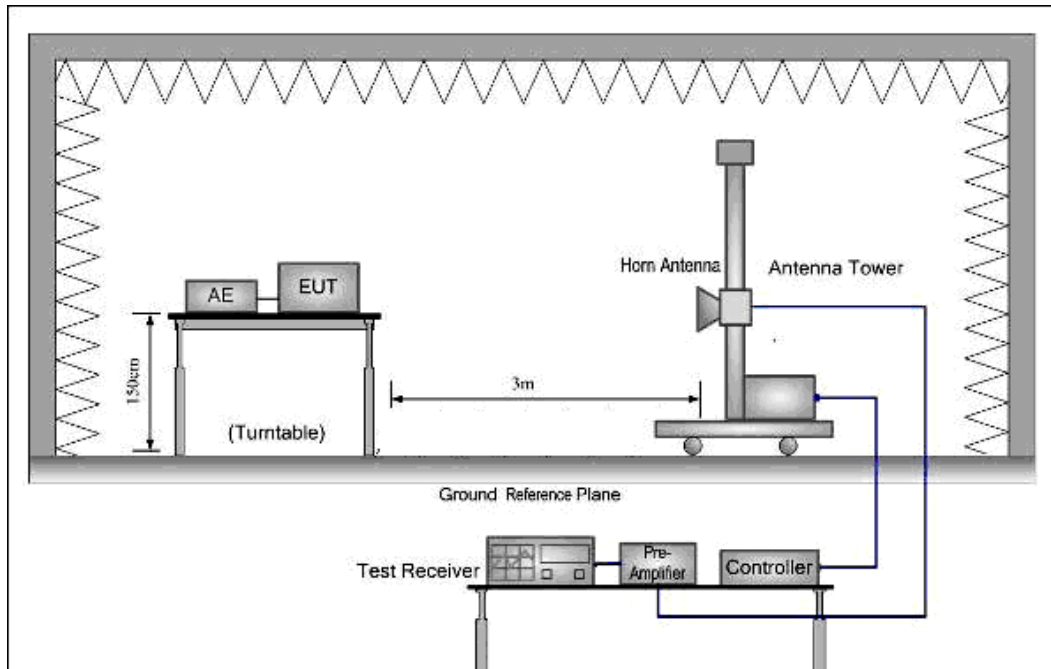
1) 9K to 30MHz emissions:



2) 30MHz to 1GHz emissions:



3) 1GHz to 40GHz emissions:



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

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



1. Test in Channel (2410MHz), keep in continuously transmitting status.

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
122.67	27.89	11.80	0.90	27.60	12.96	43.50	-30.54	QP
132.82	26.09	11.85	1.00	27.50	11.44	43.5	-32.06	QP
532.46	28.96	17.96	2.00	28.16	20.76	46.0	-25.24	QP
582.90	29.33	18.54	2.10	28.33	21.64	46.0	-24.36	QP
1374.0	38.87	25.43	3.30	36.03	31.58	54.0	-22.42	Average
1374.0	58.74	25.43	3.30	36.03	51.45	74.0	-21.55	PK
4333.0	32.57	30.46	5.85	34.77	33.97	54.0	-19.03	Average
4333.0	46.30	30.46	5.85	34.77	47.84	74.0	--26.16	PK
2410.0	55.01	29.38	4.30	35.60	51.49	94.0	-42.51	Average
2410.0	55.86	27.58	4.30	35.60	52.14	114.0	-61.86	PK

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
102.75	26.39	11.20	0.90	27.66	10.82	43.5	-32.68	QP
113.42	27.86	11.80	0.90	27.60	12.96	43.5	-30.54	QP
229.82	30.46	9.67	1.30	27.18	14.25	46.0	-31.75	QP
4762.0	33.00	31.45	6.20	33.59	37.07	54.0	-16.93	Average
4762.0	45.10	31.45	6.20	33.59	49.17	74.0	-24.83	PK
2410.0	79.46	27.58	4.30	35.60	75.74	94.0	-18.26	Average
2410.0	80.33	27.58	4.30	35.60	76.61	114.0	-37.39	PK
2751.0	30.42	28.30	4.70	35.71	27.71	54.0	-26.29	Average
2751.0	52.28	28.30	4.70	35.71	49.57	74.0	-24.43	PK
3516.0	31.08	28.99	5.27	34.99	30.36	54.0	-23.64	Average
3516.0	51.80	28.99	5.27	34.99	51.08	74.0	-22.92	PK



2. Test in Channel (2445 MHz), keep in continuously transmitting status.

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
121.98	28.17	11.80	0.90	27.60	13.27	43.50	-30.23	QP
202.66	33.22	8.97	1.30	27.34	16.35	43.5	-27.25	QP
253.10	26.09	11.85	1.00	27.50	11.44	43.5	-32.06	QP
1544.0	37.12	25.10	3.47	35.88	29.80	54.0	-25.20	Average
1544.0	58.12	25.10	3.47	35.88	50.80	74.0	-13.20	PK
2717.0	29.55	28.22	4.70	35.68	26.78	54.00	-27.22	Average
2717.0	51.77	28.22	4.70	35.68	49.00	74.00	-25.00	PK
4674.0	32.98	31.24	6.10	34.03	36.29	54.0	-17.71	Average
4674.0	44.94	31.24	6.10	34.03	48.25	74.0	-25.75	PK
2445.0	57.45	27.57	4.37	35.60	53.79	94.0	-40.21	Average
2445.0	59.01	27.57	4.37	35.60	55.35	114.0	-58.65	PK

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
153.19	27.00	9.00	1.10	27.41	9.69	43.5	-32.68	QP
144.46	26.79	10.20	1.00	27.45	10.54	43.5	-32.96	QP
174.59	32.29	8.37	1.20	27.33	14.52	43.50	-28.98	QP
967.99	28.98	21.38	2.70	26.88	26.18	54.0	-27.82	QP
2853.0	31.85	28.43	4.70	35.75	29.23	54.0	-24.77	Average
2853.0	51.96	28.43	4.70	35.75	49.34	74.0	-24.66	PK
4685.0	32.42	31.38	6.10	33.92	35.88	54.0	-18.22	Average
4685.0	44.93	31.38	6.10	33.92	48.39	74.0	-25.61	PK
2445.0	87.06	27.57	4.37	35.60	83.39	94.0	-10.61	Average
2445.0	89.33	27.57	4.37	35.60	85.66	114.0	-28.34	PK



3. Test in Channel (2470MHz), keep in continuously transmitting status.

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
319.16	28.13	13.50	1.60	27.22	16.01	46.0	-29.99	QP
347.19	24.90	14.30	1.70	27.43	11.44	43.5	-32.06	QP
350.10	28.28	14.40	1.70	27.45	16.93	46.0	-29.99	QP
1697.0	32.76	24.98	3.70	35.79	25.65	74.0	-28.35	Average
1697.0	52.88	24.98	3.70	35.79	45.77	74.0	-28.23	PK
4850.0	34.23	31.56	6.40	33.26	37.20	54.0	-16.80	Average
4850.0	46.49	31.56	6.20	33.26	49.46	74.0	-24.54	PK
2470.0	54.02	27.56	4.40	35.60	50.38	94.0	-43.62	Average
2470.0	56.43	27.56	4.40	35.60	52.79	114.0	-61.21	PK
2802.0	29.64	28.42	4.70	35.73	27.04	54.0	-26.96	Average
2802.0	50.87	28.42	4.70	35.73	48.27	74.0	-25.73	PK

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
303.54	27.17	12.84	1.60	27.10	14.51	46.0	-31.49	QP
356.980	26.92	12.10	1.50	27.13	13.38	46.0	-32.62	QP
413.15	26.94	16.36	1.80	27.81	17.30	46.0	-28.70	QP
608.12	28.20	18.56	2.20	28.33	20.63	46.0	-25.37	QP
2785.0	30.32	28.38	4.70	35.72	27.68	54.0	-26.32	Average
2785.0	51.95	28.38	4.70	35.72	49.31	74.0	-24.69	PK
4839.0	31.95	31.55	6.40	33.26	49.19	54.0	-36.64	Average
4839.0	44.50	31.55	6.40	33.26	49.19	74.0	-24.81	PK
2470.0	79.60	29.56	4.40	35.60	76.45	94.0	-17.55	Average
2470.0	81.35	27.56	4.40	35.60	78.20	114.0	-35.80	PK



Remark:

- 1). According to 15.249 (e) As shown in Section 15.35(b), 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.
- 2) Sweep from 30MHz to 26GHz, find the max radiated emissions and record it, when the emissions are too weak to be detected, it will not be reported.

Test results: The unit does meet the FCC requirements.



7.3.2 Occupied Bandwidth & Band Edge

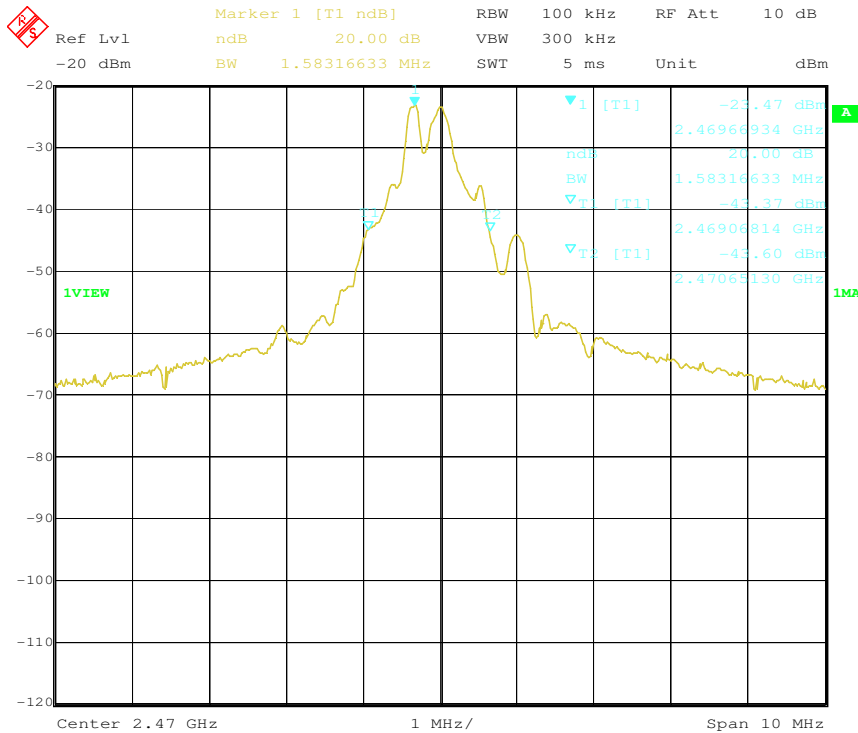
Test Requirement: FCC Part 15 C Section 15.249
Test Method: ANSI C63.4:2003 and FCC Part 2.1049
Test Date: 2011-01-31

Operation within the band 2.410 to 2.470GHz

Requirements: 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.

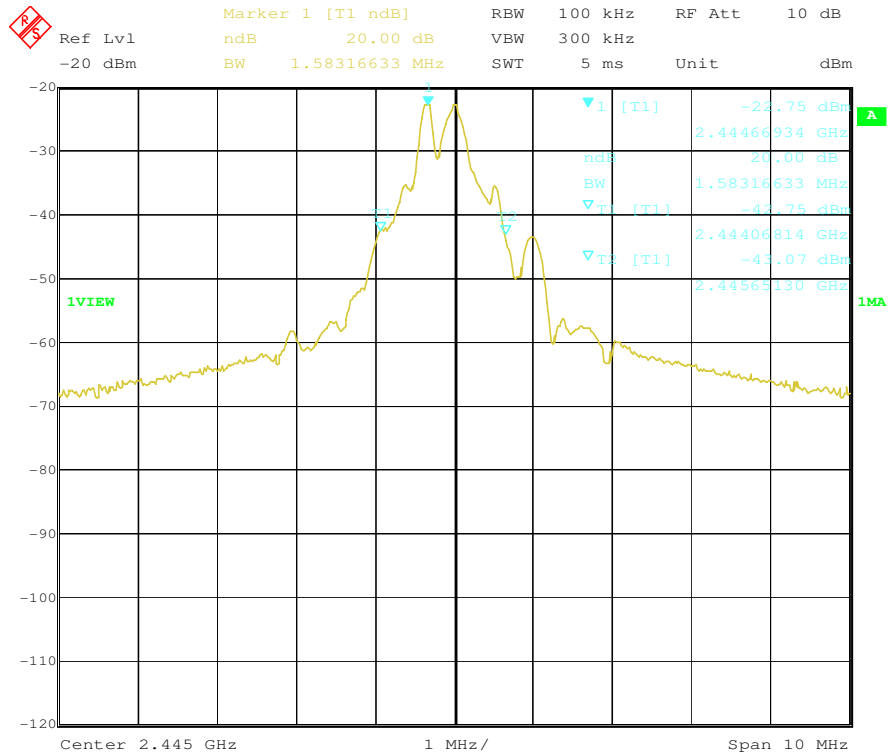
Method of measurement: A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken.

1. Test in the lowest frequency 2.410GHz

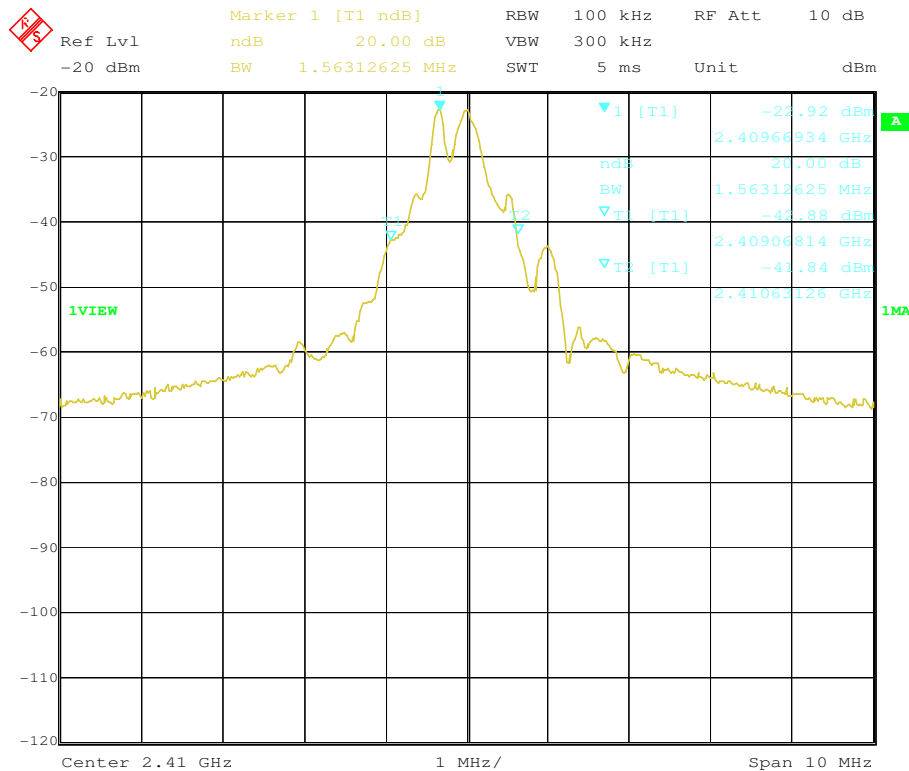




2. Test in the middle frequency 2.445GHz



3. Test in the highest frequency 2.470GHz

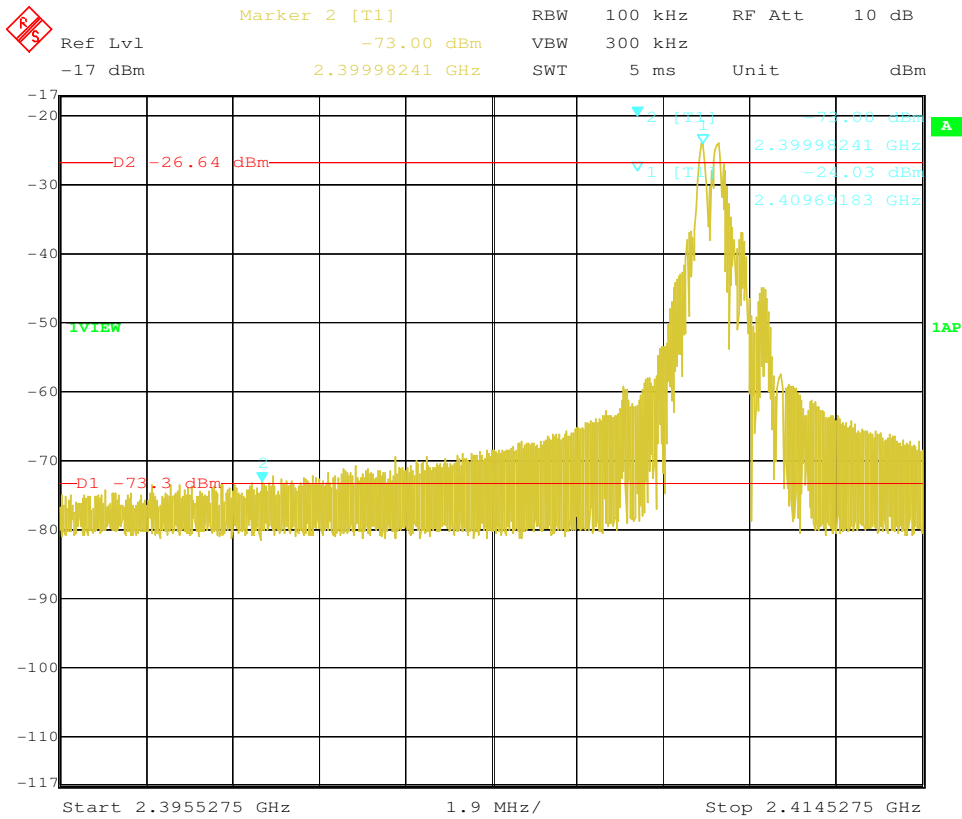




The Band Edge Emission as below:

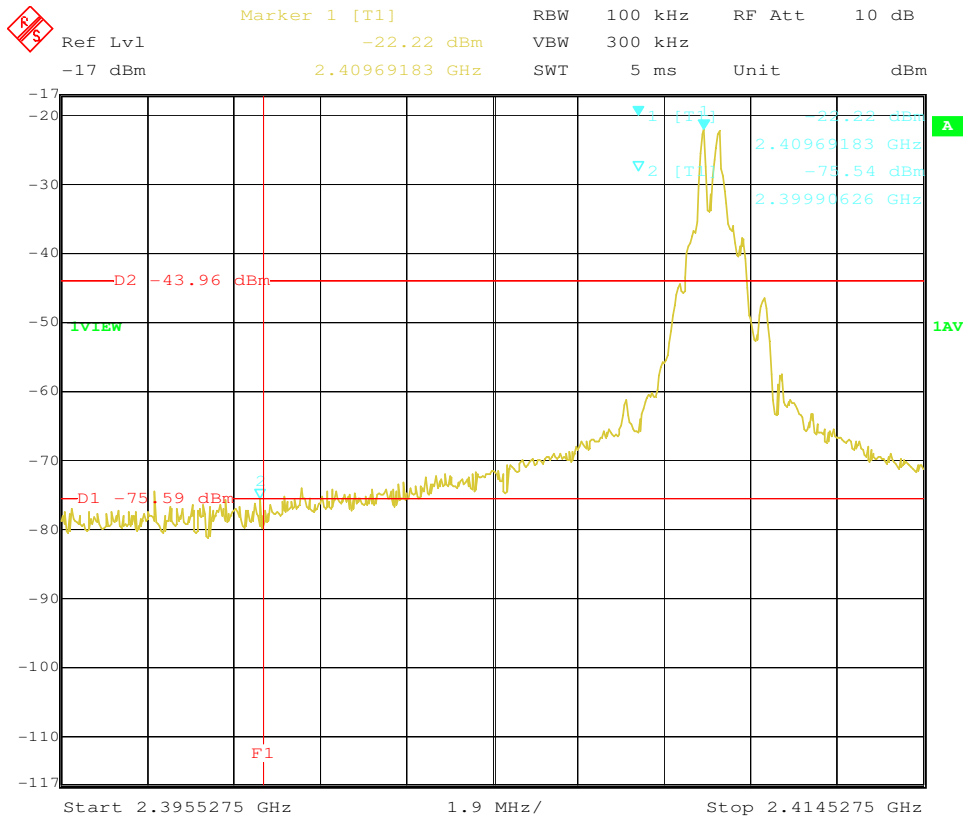
Band Edge 2.4GHz

Detector mode: Peak





Detector mode: Average



For 2.40GHz band edge checked with 2.41GHz frequency operated, the delta shown at the plots are -48.97dB for peak detector mode and -53.32 for Average detector mode.

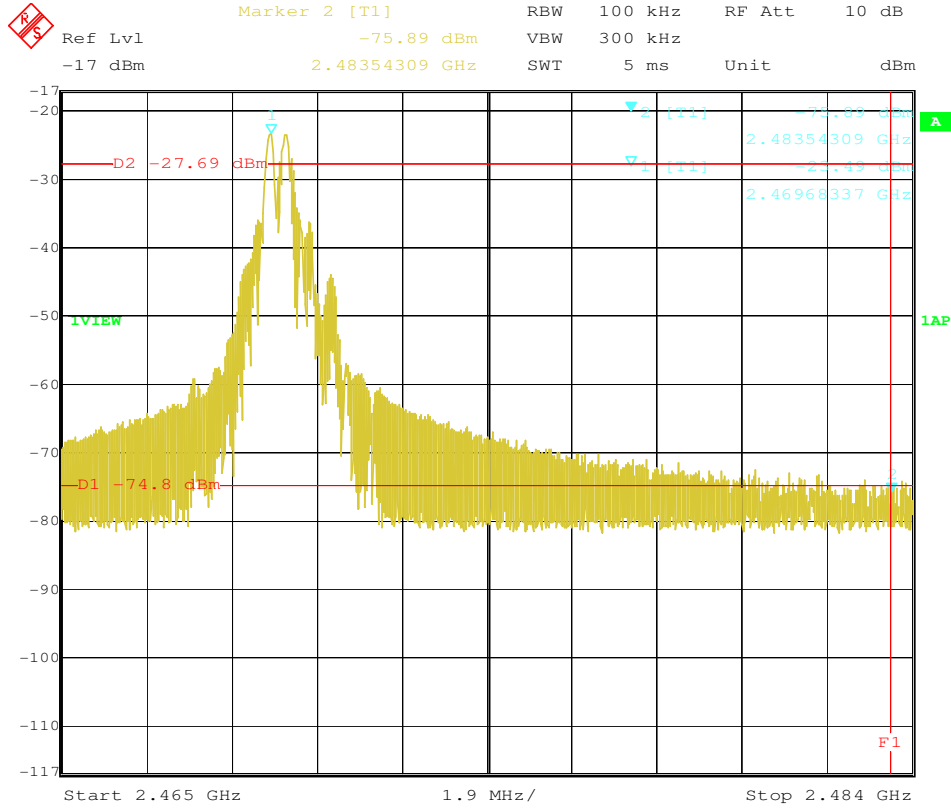
With the peak value 76.61dBuV/m and average value at 75.74dBuV/m for the fundamental, the spurious emission level at 2.400GHz were 27.64dBuV/m for peak and 22.42dBuV/m for average which is below the limit 74.0dBuV/m for peak and 54.0dBuV/m for average.

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at www.sgs.com/terms_and_conditions.htm and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at www.sgs.com/terms_e-document.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



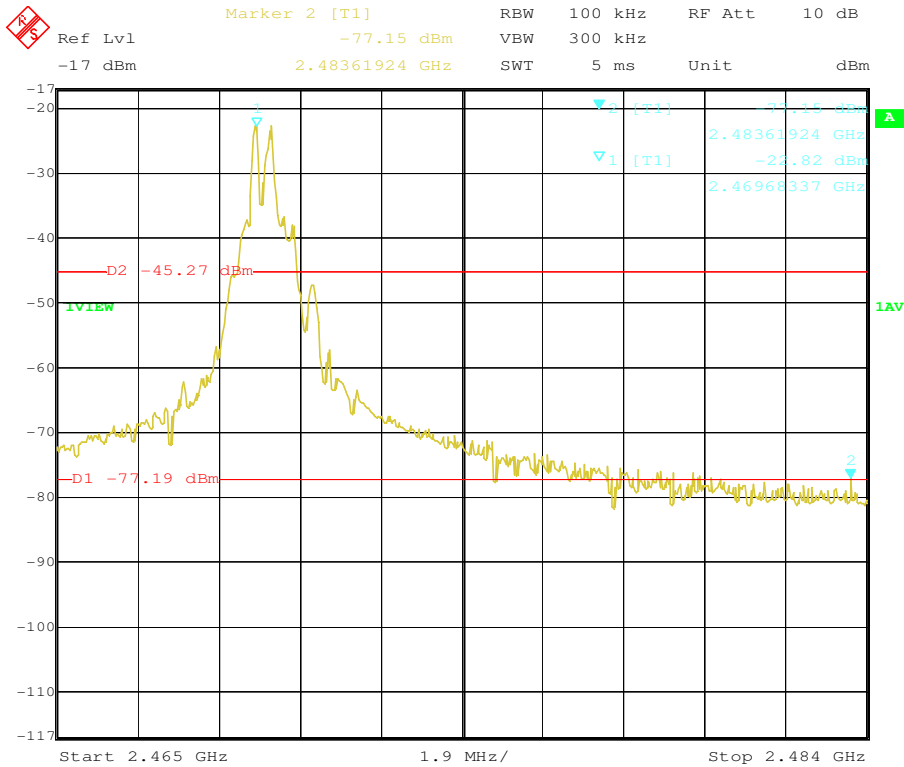
Highest Band Edge 2.4835GHz

Detector mode: Peak





Detector mode: Average



For 2.4835GHz bandage checked with 2.470GHz frequency operated, the delta shown at the plots are -52.40dB for peak detector mode and -54.33dB for Average detector mode.

With the peak value 78.20dBuV/m and average value at 76.45dBuV/m for the fundamental, the spurious emission level at 2.4835GHz were 25.80dBuV/m for peak and 22.12dBuV/m for average which is below the limit 74.0dBuV/m for peak and 54.0dBuV/m for average.

The test result for the Emissions radiated outside of the specified frequency bands; please refer to the section 7.2.1 of this report.

The results: The unit does meet the FCC requirements.

End of the report