国质监认字 002号

(2002) 量认（国）字 (V2171) 号

No. L0095

Test Report No.:
FCC2004-0008-1

TEST REPORT

EUT	:	**Transmitter of RF Digital Headphone System**
MODEL/TYPE	:	**HP990 DH100**
FCC ID	:	**REDHP991-001T**
CLIENT	:	**CLASSIC TECH DEVELOPMENT LTD**
Classification of Test	:	**COMMISSION TEST**

Guangzhou Testing & Inspection Institute
for Household Electrical Appliances
广州日用电器检测所 GTIHEA
国家日用电器质量监督检验中心

Add.: 204 Xingang West Road Guangzhou 510302 P.R. China
Telephone: 86-20-84451692 Fax: 86-20-84183160
E-mail: EMC@ GTIHEA.COM

Client	**Name:** CLASSIC TECH DEVELOPMENT LTD **Address:** 11-12/F., Yue Xin Industrial Bldg, 87 Hung To Road, Kwun Tong, Kowloon, Hong Kong
Manufacturer	**Name:** CLASSIC TECH DEVELOPMENT LTD **Address:** 11-12/F., Yue Xin Industrial Bldg, 87 Hung To Road, Kwun Tong, Kowloon, Hong Kong
Equipment under Test	**Name** : Transmitter of RF Digital Headphone System **Model/ type** : HP990 **FCC ID** : REDHP991-001T **Trade mark** : Promowide **Serial no.** : — **Sampling** : —

Date of Receipt.	**2004.10.20**	Date of Testing	**2004.10.25-2004.10.29**

Test Specification	**Test Result**
FCC PART 15,Subpart C, 2004	**PASS**

Evaluation of Test Result	This device complies with the requirements of Federal Communications Commission (FCC) Rules and Regulations Part 15. **Issue Date: April 18, 2005**

Tested by:	Reviewed by:	Approved by:
Chen Xiuliu	Wang Xiaoyan	
Name Signature	Name Signature	Name Signature

Other Aspects:

NONE

Abbreviations: OK, Pass = passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

Contents

1. General Product Information

This report covers two models DH100 and HP990. PCB, Schematics, outlook appearances of these two models are exactly the same, only naming of model is different for marketing purpose. All tests were performed on model HP990.

1.1 Product Description

Equipment Type	:	Intentional radiator
Frequency Characteristics	:	From 2400 MHz to 2483.5 MHz
Modulation Type	:	Frequency Hopping, FSK
Bandwidth & Channel Spacing	:	2404.2 MHz – 2480.2 MHz
Ratings	:	Powered by AC/DC Adaptor Input: AC120V, 60Hz Output: DC9V, 400mA
Antenna Type	:	Internal permanently attached antenna
Antenna Gain	:	0 dB

1.2 Independent Operation Modes

The basic operation modes of the EUT are:

1. Transmitting
2. Stand-by

1.3 Submitted Documents

Operating Instructions and Installation Manual
Rating Label
Wiring Diagram
Construction Drawing
Photographs of EUT
Material Bill (Parts List)

2. Test Sites

2.1 Test Facilities

The tests and measurements refer to this report were performed by EMC testing Lab. of Guangzhou Testing & Inspection Institute for Household Electric Appliances.

Add. : 204, Xingang West Road, Guangzhou, 510300, P.R. China
Telephone : 86-20-84451692
Fax : 86-20-84183160

The EMC testing laboratory has been recognized by China National Commission for Laboratory Assessment, and authorized by Nemko of Norway since 1997(Aut. No. ELA139), and authorized by TüV Rheinland of Germany since 1998(Aut. No. 9868976-1216), and registered by FCC since 2001(Registered No. 102430).

2.2 Description of Non-standard Method and Deviations

The testing and measurement method used in this report are all the standard method applied, no any non-standard method and deviations from the used standard were used.

2.3 List of Test and Measurement Instruments

Refer to **Appendix A**.

3. Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

3.2 Physical Configuration for Testing

Refer to relative descriptions in this test report.

3.3 Test Operation Mode and Test Software

Refer to **Test Setup.**

3.4 Special Accessories and Auxiliary Equipment

1 kHz audio signal was used during test.

3.5 Countermeasures to Achieve EMC Compliance

None.

4. Emission test results (intentional radiator)

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 Subpart C and ANSI C63.4: 2003 for FCC Certification.

Test Standards and Results Summary						
No	Test Item	Test Requirement	Test Method	Test Result		
				Pass	Failed	N/A
1	Conducted Emissions 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4: 2003 and Public Notice DA 00-75	☒	☐	☐
2	Carrier Frequency Separation	FCC 47CFR 15.247(a)(1)	ANSI C63.4: 2003 and Public Notice DA 00-75	☒	☐	☐
3	20dB Bandwidth	FCC 47CFR 15.247(a)(1)	ANSI C63.4: 2003 and Public Notice DA 00-75	☒	☐	☐
4	Number of Hopping Frequency	FCC 47CFR 15.247(a)(1)(iii)	ANSI C63.4: 2003 and Public Notice DA 00-75	☒	☐	☐
5	Dwell Time	FCC 47CFR 15.247(a)(1)(iii)	ANSI C63.4: 2003 and Public Notice DA 00-75	☒	☐	☐
6	Maximum Peak Output Power	FCC 47CFR 15.247(b)(1)	ANSI C63.4: 2003 and Public Notice DA 00-75	☒	☐	☐
7	Band Edge Compliance	FCC 47CFR 15.247(c)	ANSI C63.4: 2003 and Public Notice DA 00-75	☒	☐	☐
8	Spurious Emission	FCC 47CFR 15.247(c)	ANSI C63.4: 2003 and Public Notice DA 00-75	☒	☐	☐

Note: N/A - Not Applicable

4.1 Conducted Emission

RESULT : Pass

Test procedure : ANSI C63.4: 2003
Frequency range : 0.15MHz ~30MHz
Limits : Section 15.207
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

Test Setup:

The EUT was placed on a wooden table 80cm high above ground plane.

According to the requirements of ANSI C63.4: 2003, conducted emission from the EUT measured in the frequency between 0.15MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

Test Results:

Test Conditions

Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting

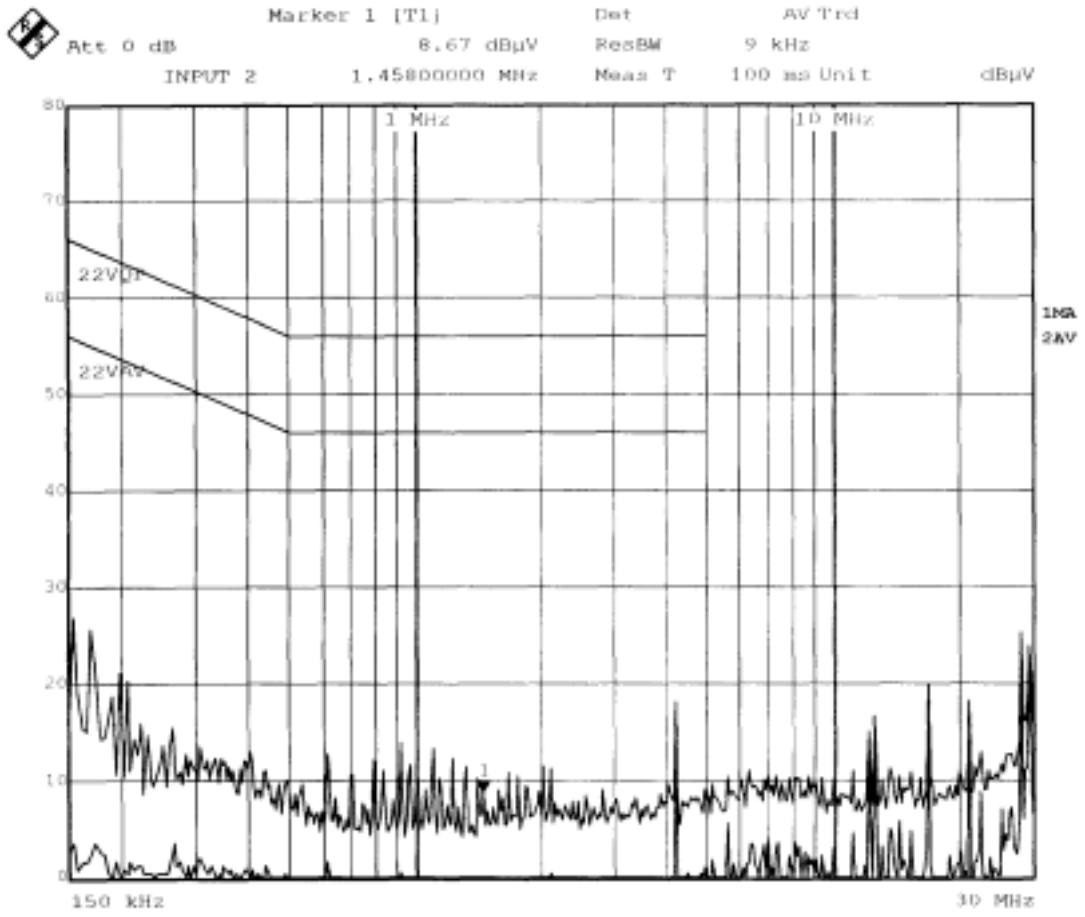
Conducted Emission						
Freq. (MHz)	QP Reading (dBμV)	Phase	QP Limits (dBμV)	AV Reading (dBμV)	Phase	AV Limits (dBμV)
/	/	/	/	/	/	/
/	/	/	/	/	/	/
/	/	/	/	/	/	/

Note:
Where PK reading is less than relevant limit decrease 25dB, the QP reading and AV reading will not be recorded.

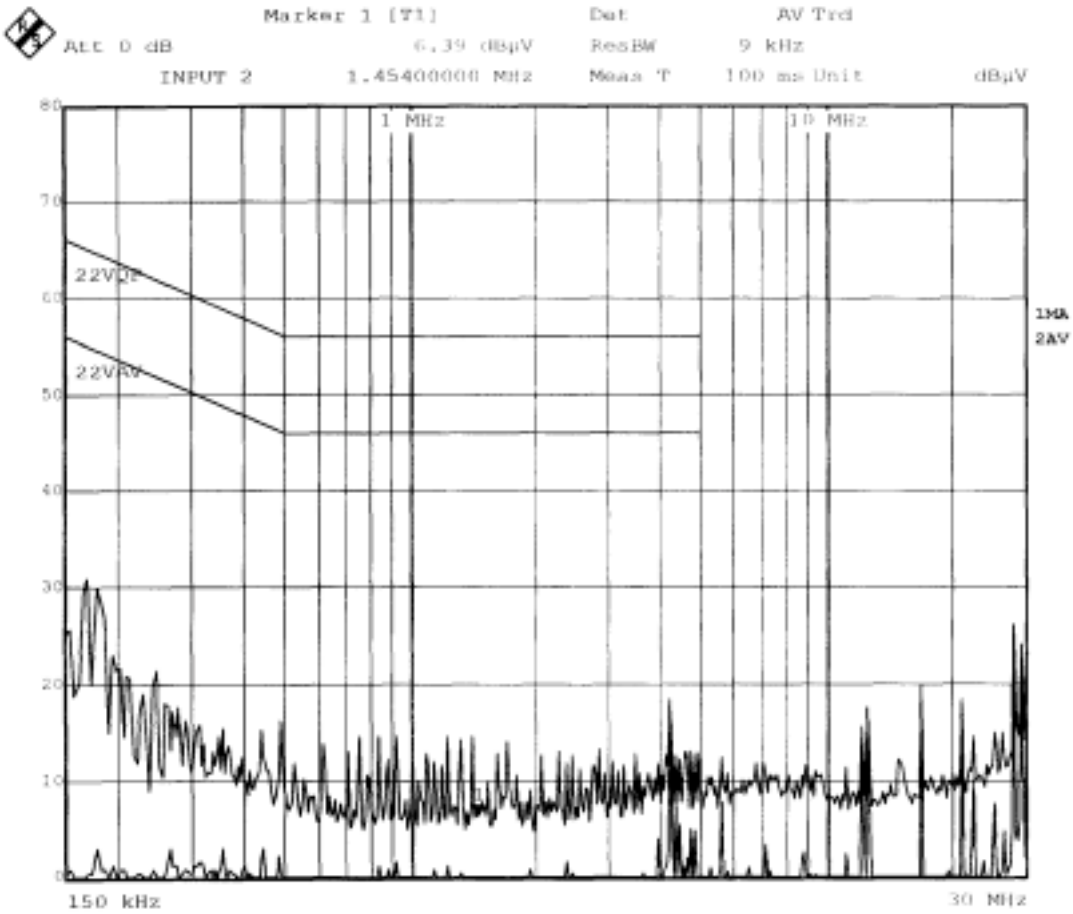
Where QP reading is less than relevant AV limit, the AV reading will not be measured.

Remark: Calculated measurement uncertainty: 2.5dB (0.15~30MHz)

Scan Graph and Scan setting



(L line)


Marker 1 [T1]
Det AV Trcd
Att 0 dB
6.39 dBµV
ResBW 9 kHz
INPUT 2
1.454000000 MHz
Meas T 100 ms Unit dBµV
1 MHz
10 MHz
22VQP
22VAV
1MA
2AV
150 kHz
30 MHz

(N line)

4.2 Carrier Frequency Separation

RESULT : Pass

Test procedure : ANSI C63.4: 2003 and Public Notice DA 00-75
Frequency range : 2400-2483.5 MHz
Limits : Section 15.247(a)(1)
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

Test Setup:

The carrier frequency separation was measured with a spectrum analyzer. The EUT must have its hopping function enabled.

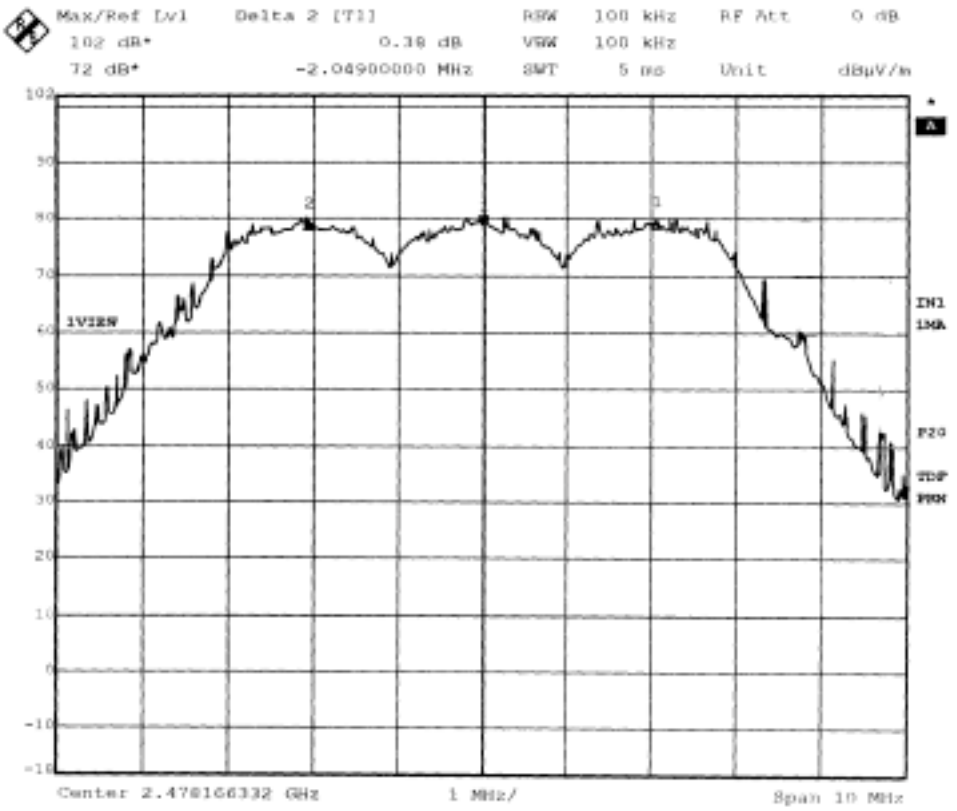
Test Results:

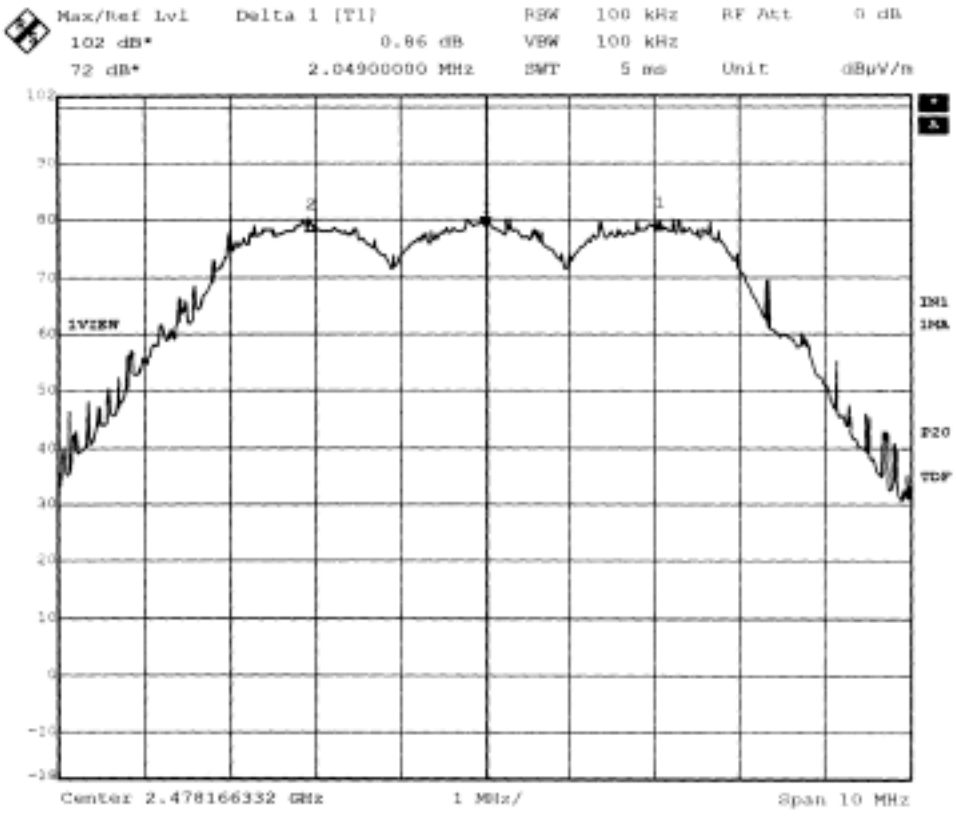
Test Conditions
Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting

Carrier Frequency Separation				
Channel	Center Freq. (GHz)	Separation (MHz)	Limit	Remark
1.	2.404348697	——	——	——
		2.049	⩾ 25kHz / 20 dB bandwidth	>20 dB bandwidth
2.	2.445330661			
		2.049	⩾ 25kHz / 20 dB bandwidth	>20 dB bandwidth
3.	2.480160320			
		——	——	——

Note: The testing result of 20 dB bandwidth refer to clause 4.5 of this report.

Scan Graph and Scan Settings





4.3 Number of Hopping Frequency

RESULT : Pass

Test procedure : ANSI C63.4: 2003 and Public Notice DA 00-75
Frequency range : 2400-2483.5 MHz
Limits : Section 15.247(a)(1)(iii)
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

Test Setup:

The number of hopping frequency was measured with a spectrum analyzer. The EUT must have its hopping function enabled. Allow the trace to stabilize.

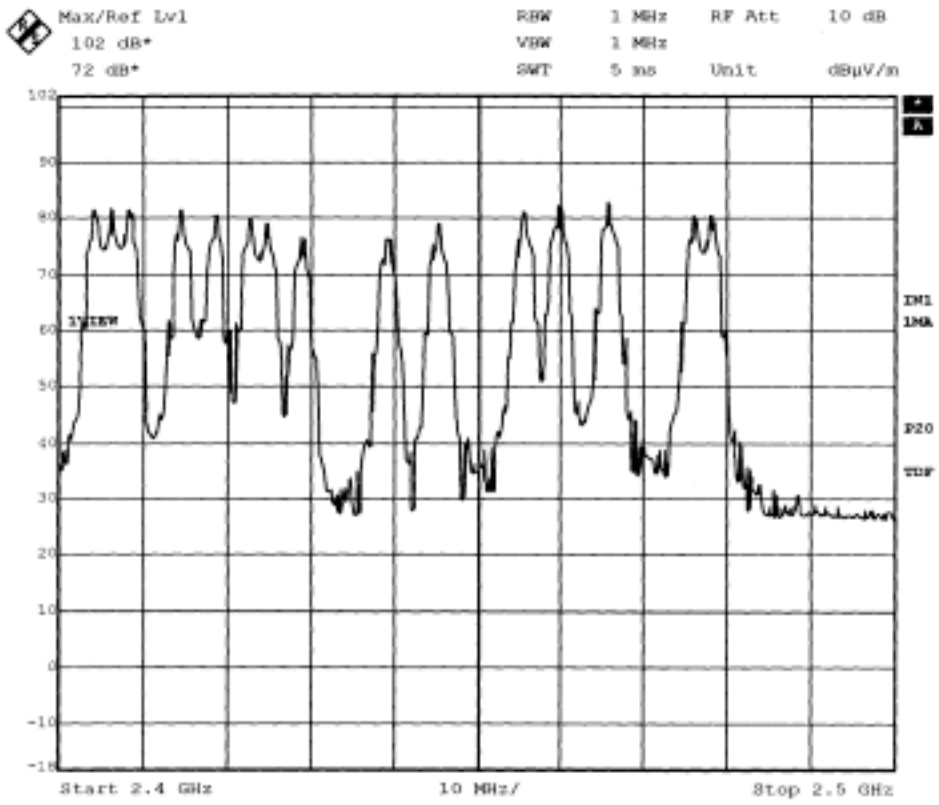
Test Results:

Test Conditions
Ambient Temperature : 25℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting

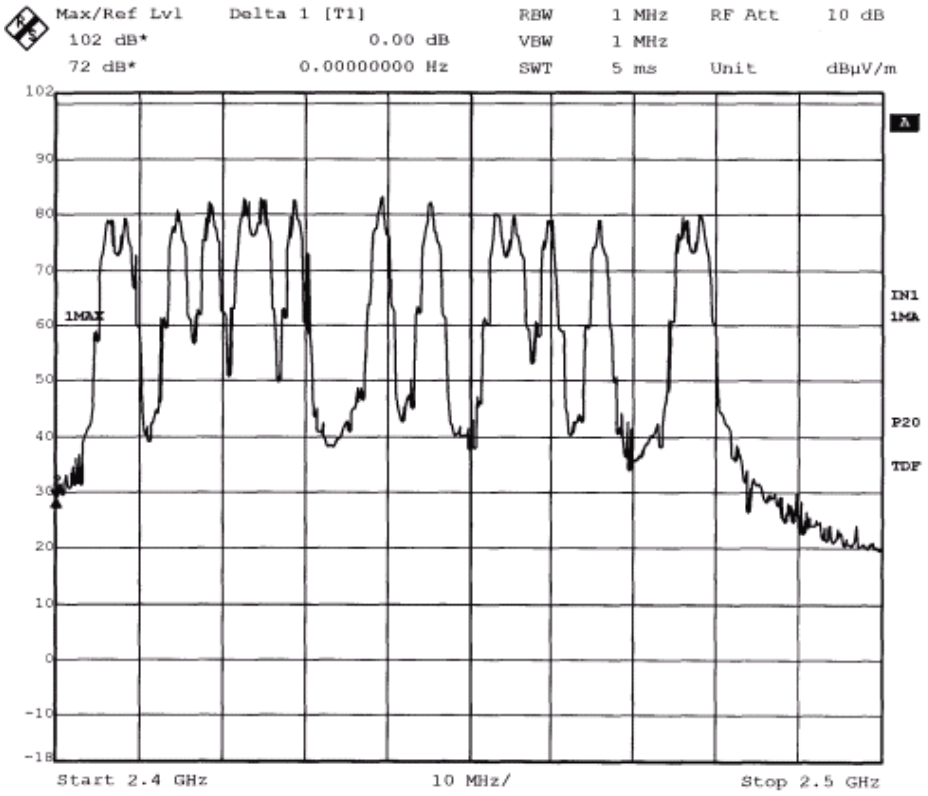
Number of Hopping Frequency		
No	Test Result	Limits
Result 1	15 non-overlapping channels	⩾15 non-overlapping channels
Result 2	15 non-overlapping channels	⩾15 non-overlapping channels

Scan Graph and Scan Settings

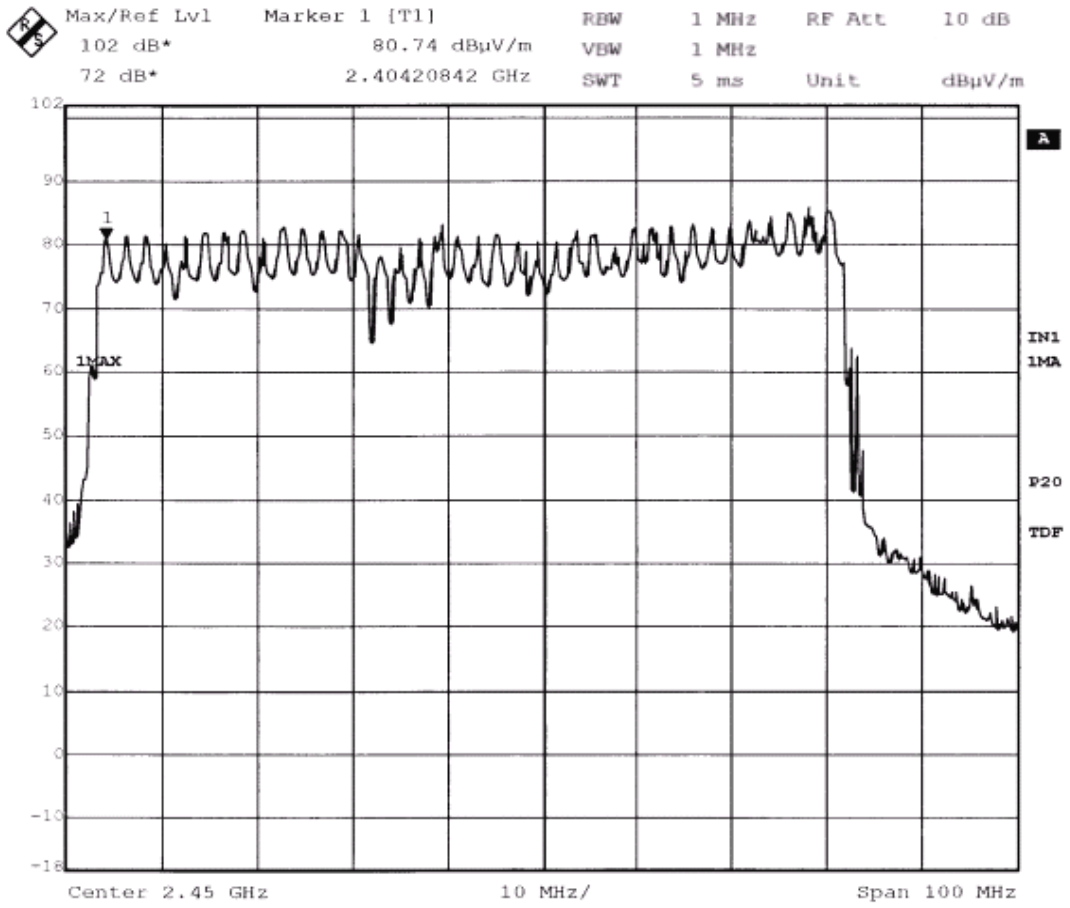
(Transmitting, Test result 1)



(Transmitting, Test result 2)



(Stand by, Total number of the channels is 38
Start at channel of 2.404 GHz, stop at channel of 2.480 GHz)



4.4 Time of Occupancy (Dwell Time)

RESULT : Pass

Test procedure : ANSI C63.4: 2003 and Public Notice DA 00-75
Frequency range : 2400-2483.5 MHz
Limits : Section 15.247(a)(1)(iii)
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

Test Setup:

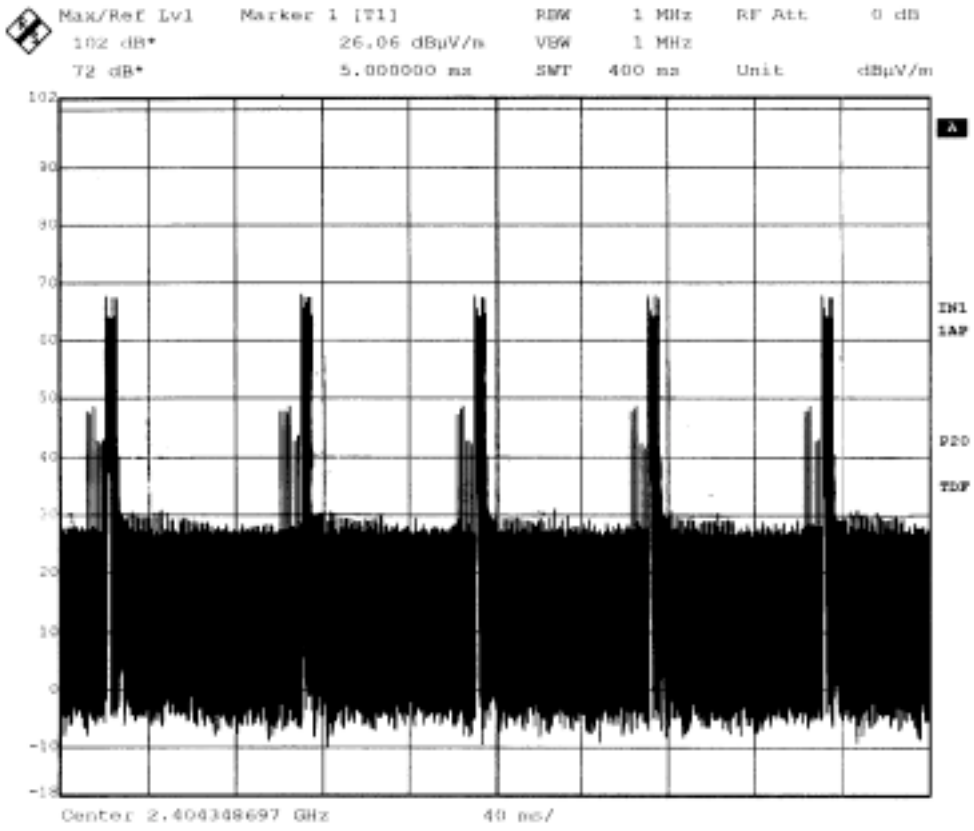
The dwell time was measured with a spectrum analyzer. The EUT must have its hopping function enabled. If possible, use the marker-delta function to determine the dwell time.

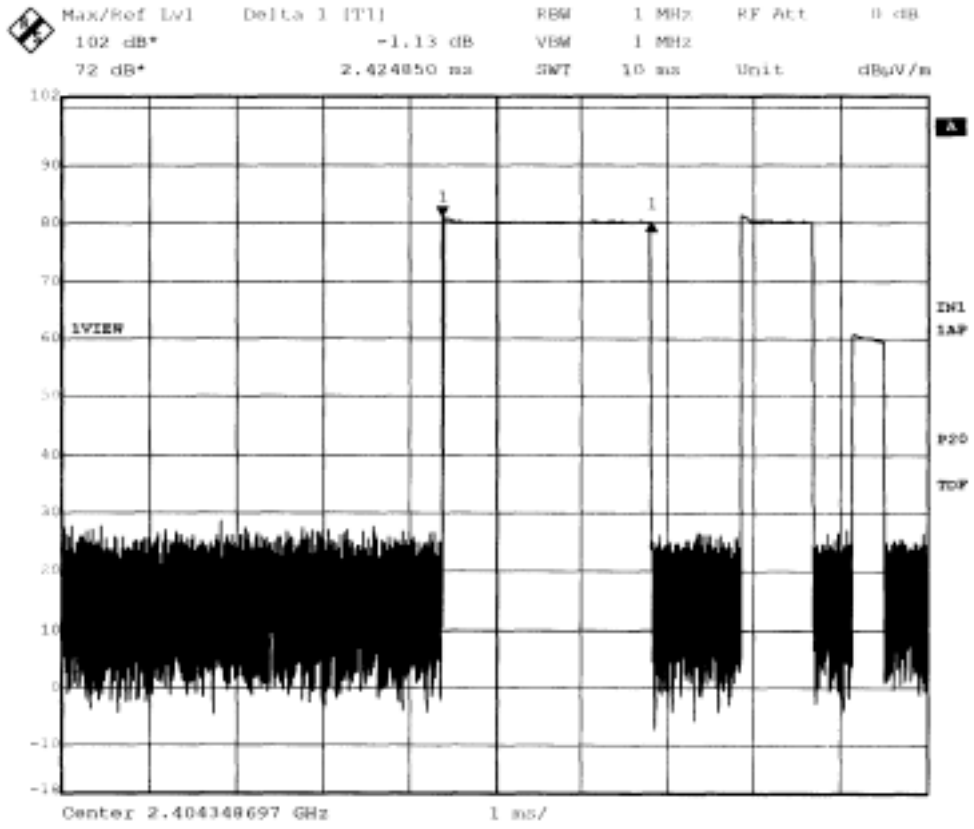
Test Results:

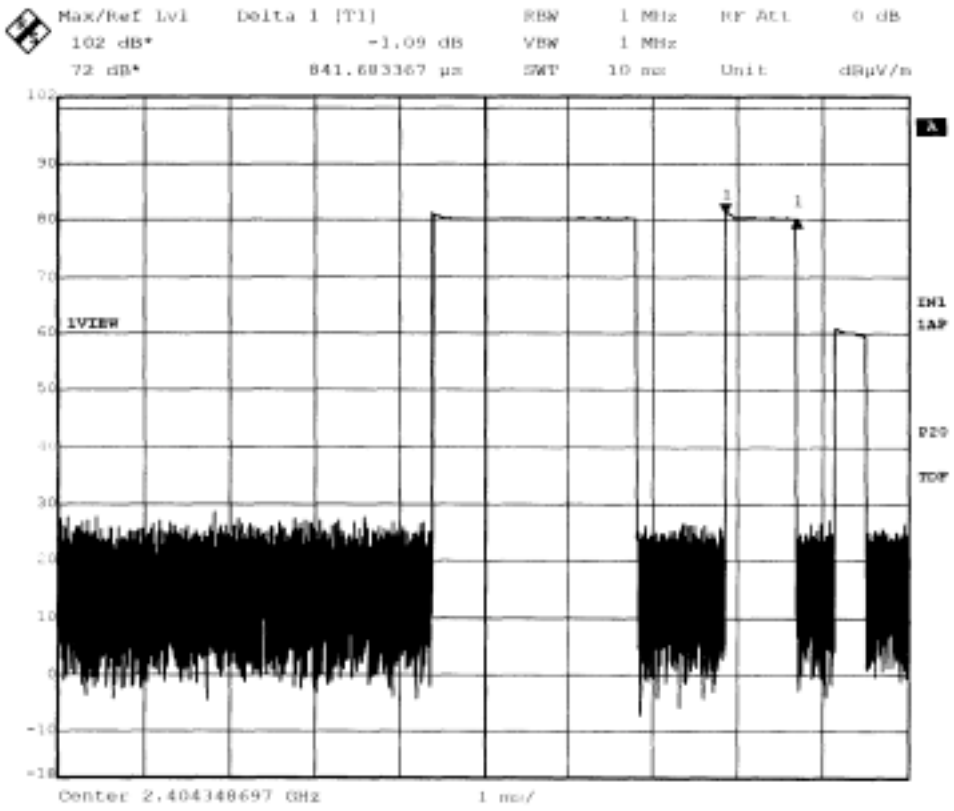
Test Conditions
Ambient Temperature : 25℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting

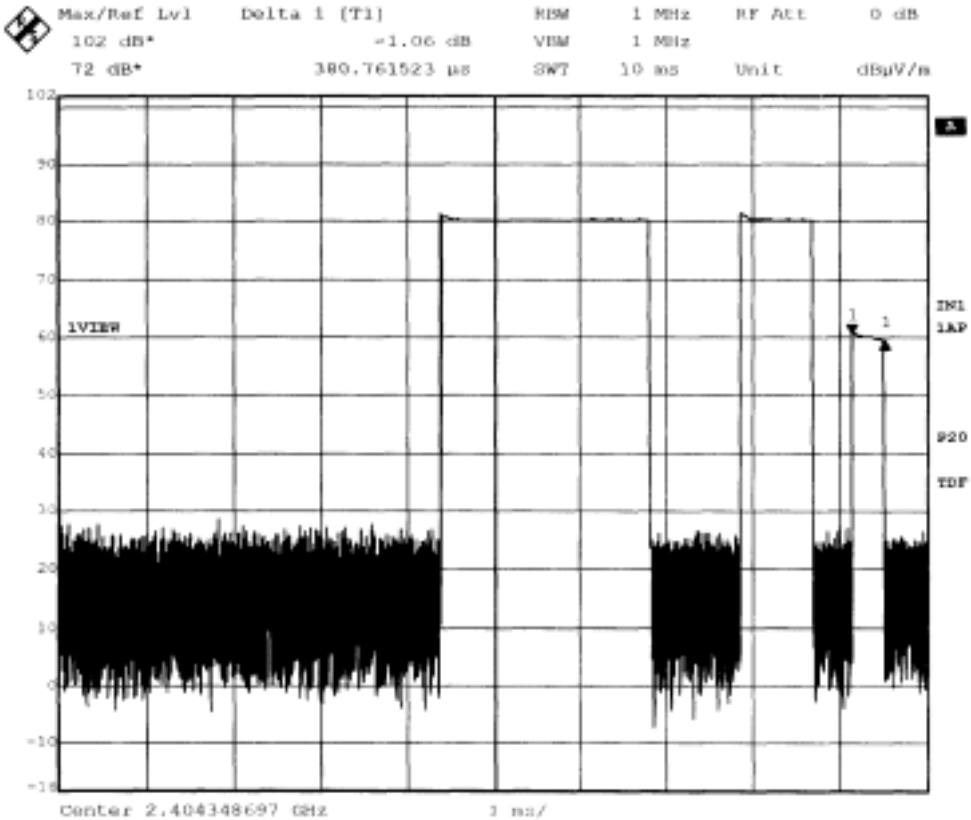
Dwell Time			
Center Freq. (GHz)	Total Time of one channel (ms)	The number of signals within 400ms	Dwell Time (ms)
2.404348697	2.424850+0.841683+ 0.380762=3.647295	5	3.647295×5×15 = 273.547125
2.445330661	2.444890+0.841683+ 0.360721=3.647294	5	3.647294×5×15 = 273.54705
2.480160320	2.444890+0.841683+ 0.360721=3.647294	5	3.647294×5×15 = 273.54705

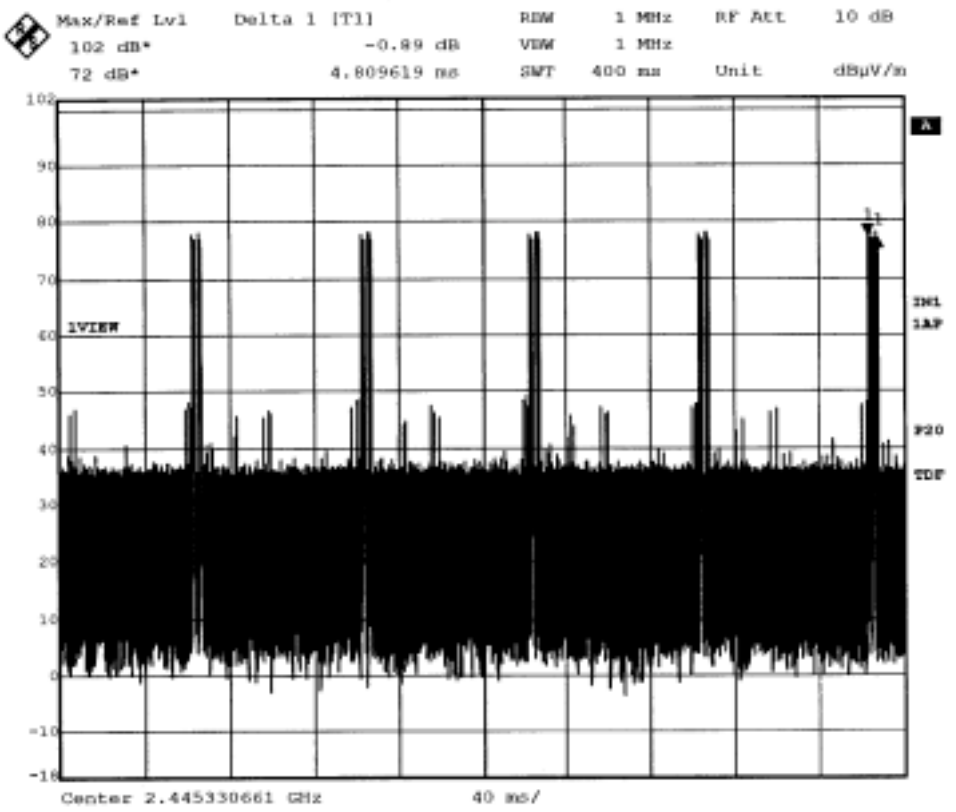
Scan Graph and Scan Settings

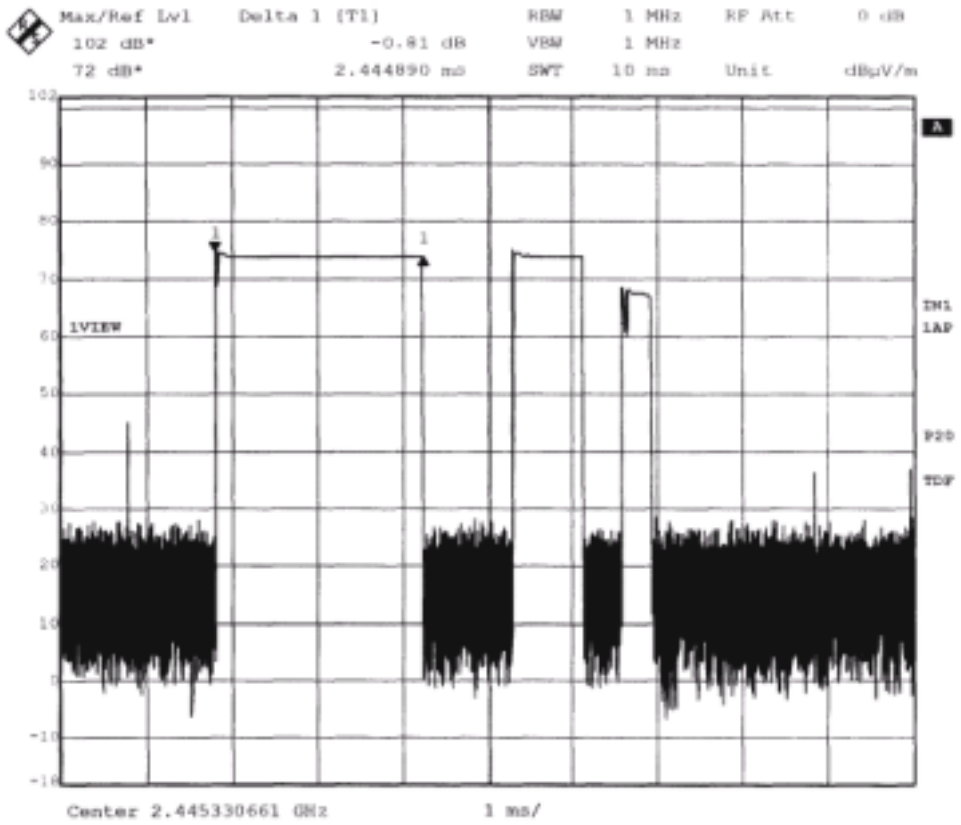


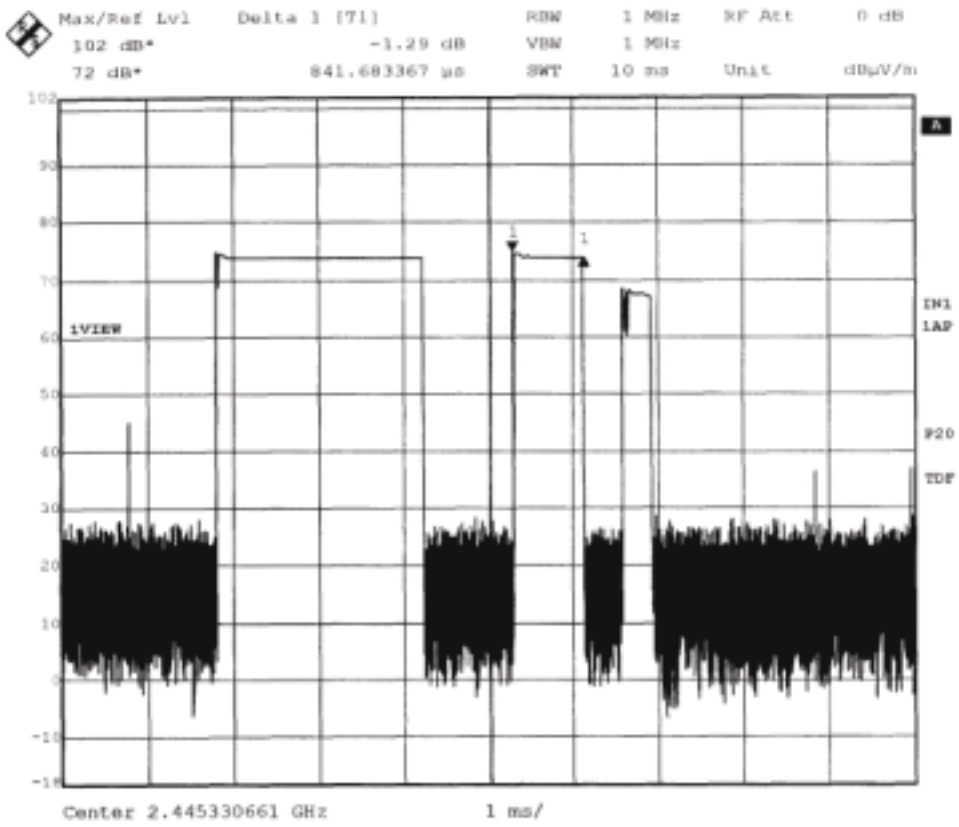


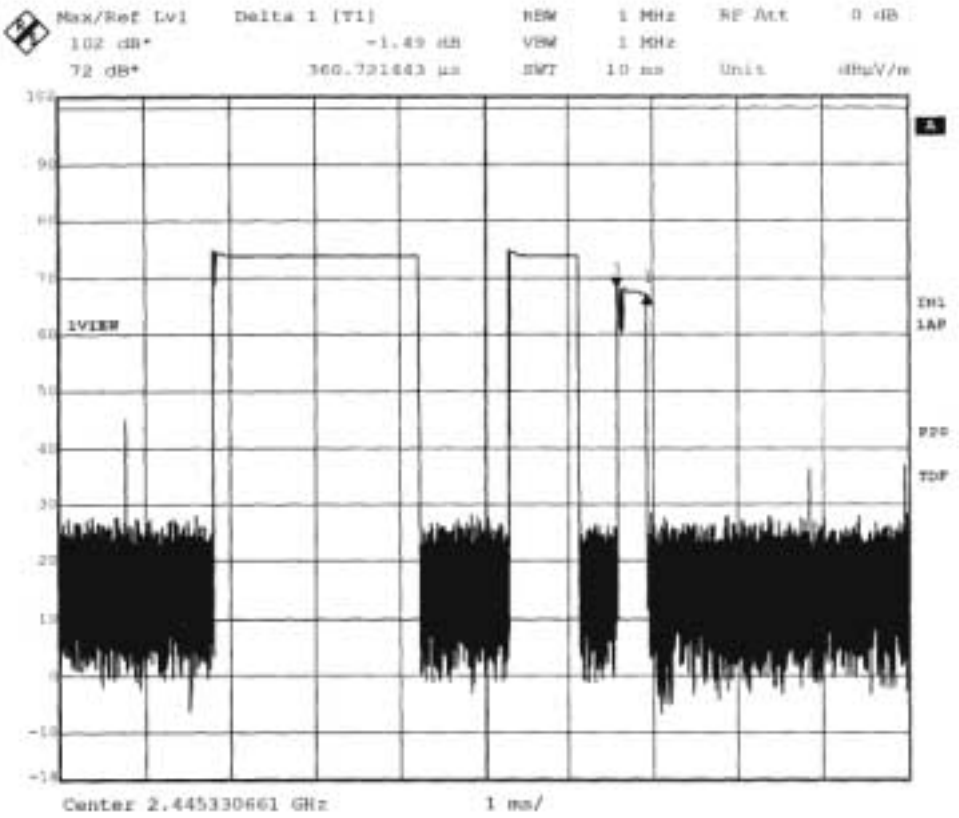

Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1]
-1.09 dB
841.683367 µs
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
Rf Att 0 dB
Unit dBµV/m
1VIEW
IN1
1AP
P20
TDF
Center 2.404348697 GHz
1 ms/

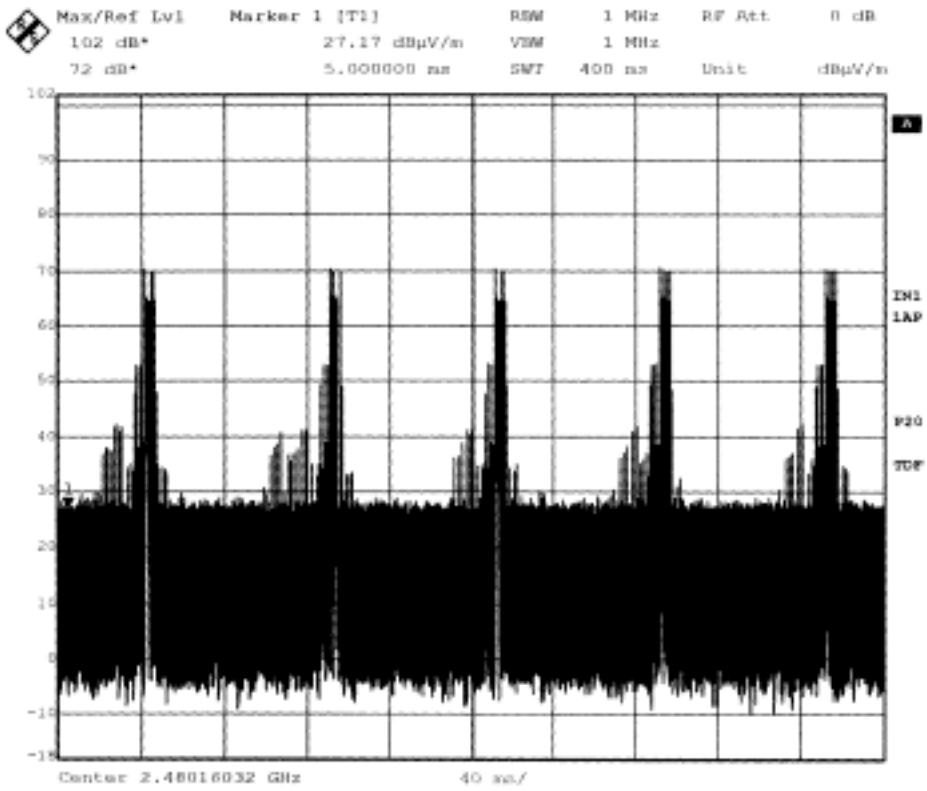

Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1]
-1.06 dB
380.761523 µs
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
Rf Att 0 dB
Unit dBµV/m
1VIEW
IN1
1AP
P20
TDF
Center 2.404348697 GHz
1 ms/

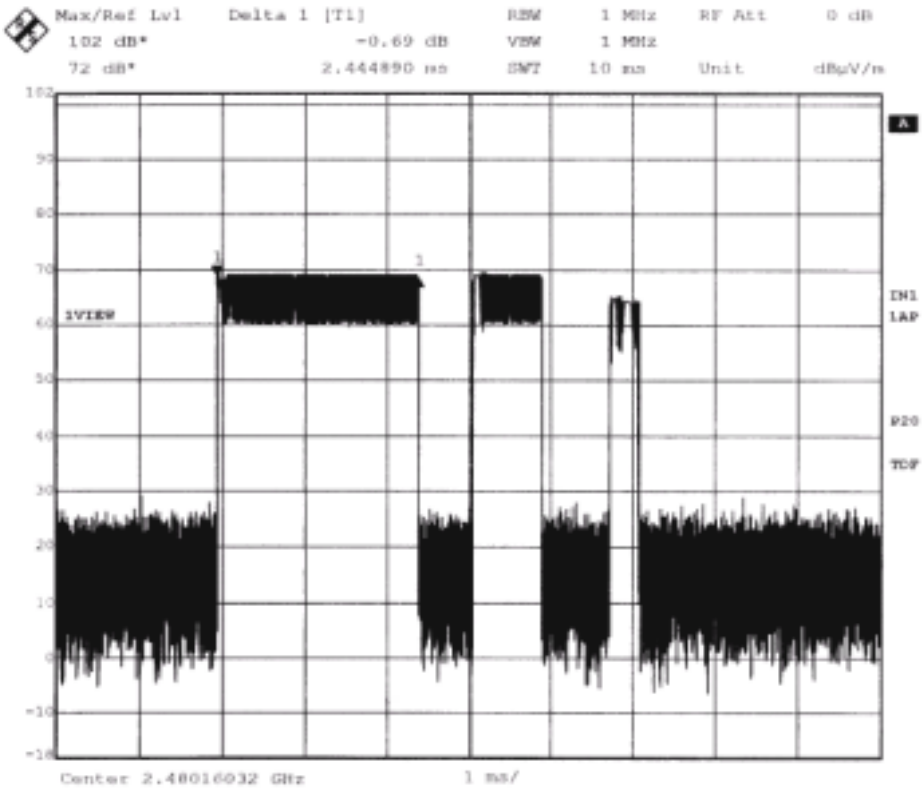

Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1]
-0.89 dB
4.809619 ms
RBW 1 MHz
VBW 1 MHz
SWT 400 ms
RF Att 10 dB
Unit dBµV/m
1VIEW
IN1
1AP
P20
TDF
Center 2.445330661 GHz
40 ms/

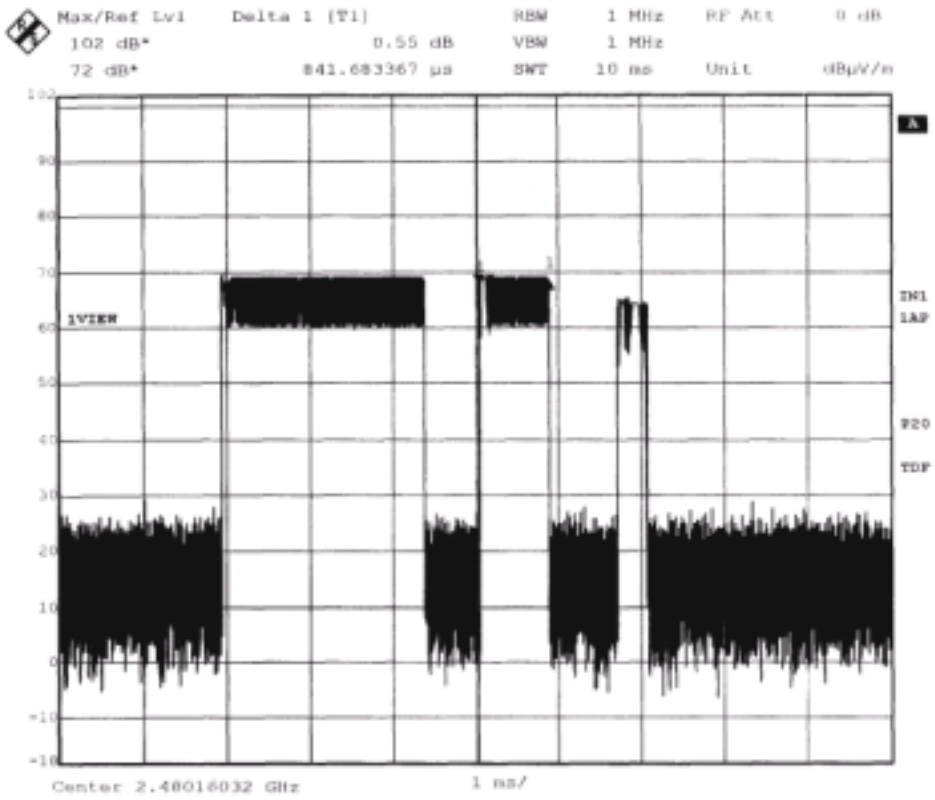

Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1]
-0.81 dB
2.444890 ms
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
1AP
P20
TDF
Center 2.445330661 GHz
1 ms/

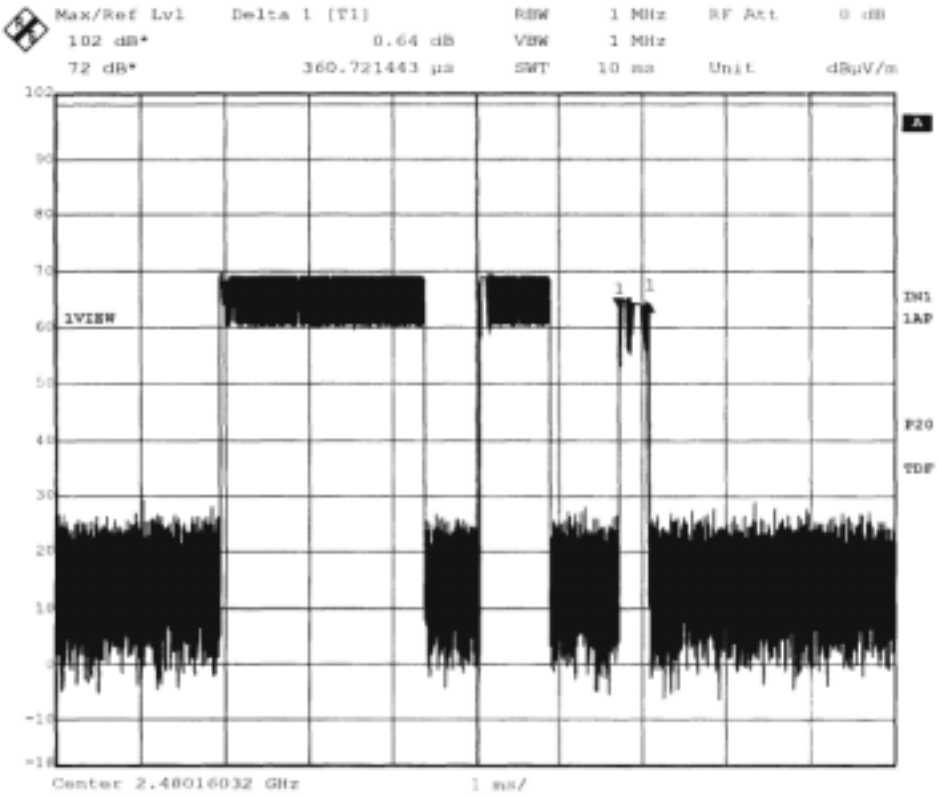

Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1]
-1.29 dB
841.683367 µs
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
1AP
P20
TDF
Center 2.445330661 GHz
1 ms/


Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1]
-1.49 dB
360.721443 µs
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
1AP
P20
TDF
Center 2.445330661 GHz
1 ms/


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
27.17 dBµV/m
5.000000 ms
RBW 1 MHz
VBW 1 MHz
SWT 400 ms
RF Att 0 dB
Unit dBµV/m
A
IN1
1AP
P20
TDF
Center 2.48016032 GHz
40 ms/


Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1]
-0.69 dB
2.444890 ms
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
RF Att 0 dB
Unit dBµV/m
1VIEW
A
IN1
1AP
P20
TDF
Center 2.48016032 GHz
1 ms/


Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1]
0.55 dB
841.683367 µs
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
RF Att 0 dB
Unit dBµV/m
1VIEW
Center 2.48016032 GHz
1 ms/


Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1]
0.64 dB
360.721443 µs
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
RF Att 0 dB
Unit dBµV/m
1VIEW
Center 2.48016032 GHz
1 ms/

4.5 20dB Bandwidth

RESULT : Pass

Test procedure : ANSI C63.4: 2003 and Public Notice DA 00-75
Frequency range : 2400-2483.5 MHz
Limits : Section 15.247(a)(1)
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

Test Setup:

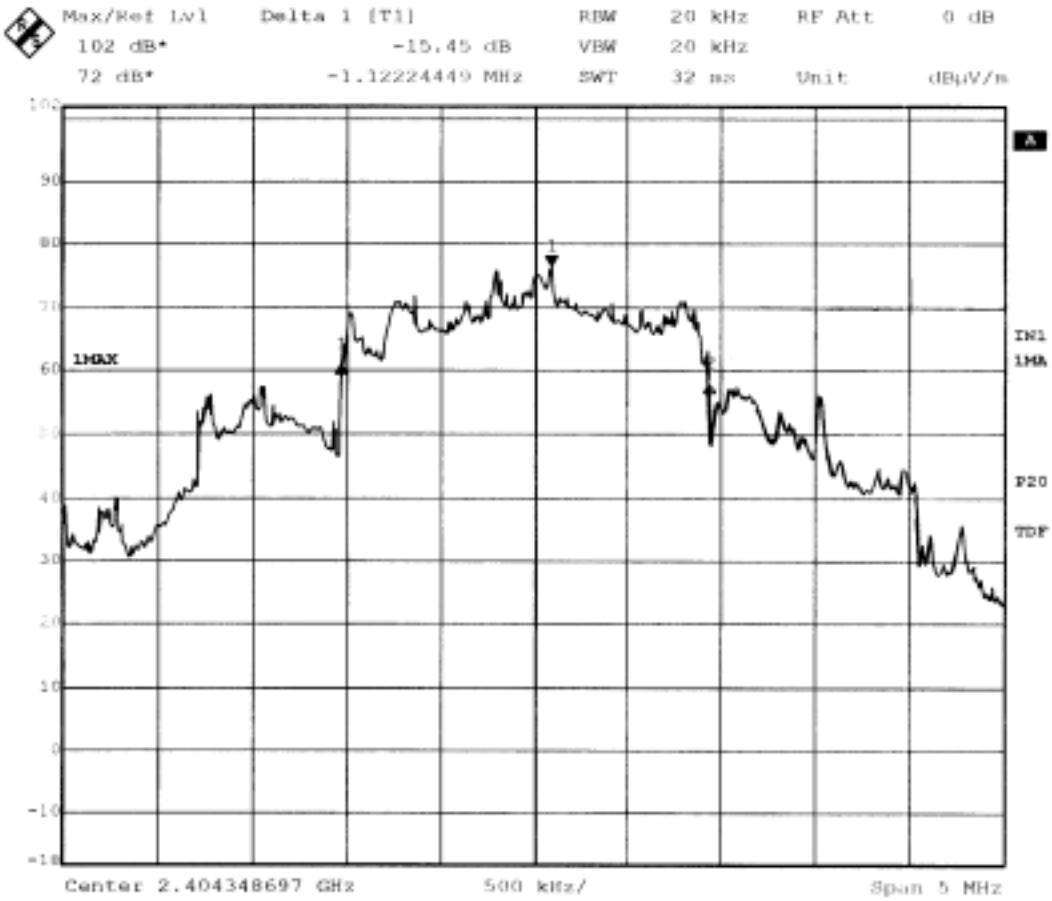
The 20dB bandwidth was measured with a spectrum analyzer. The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

Test Results:

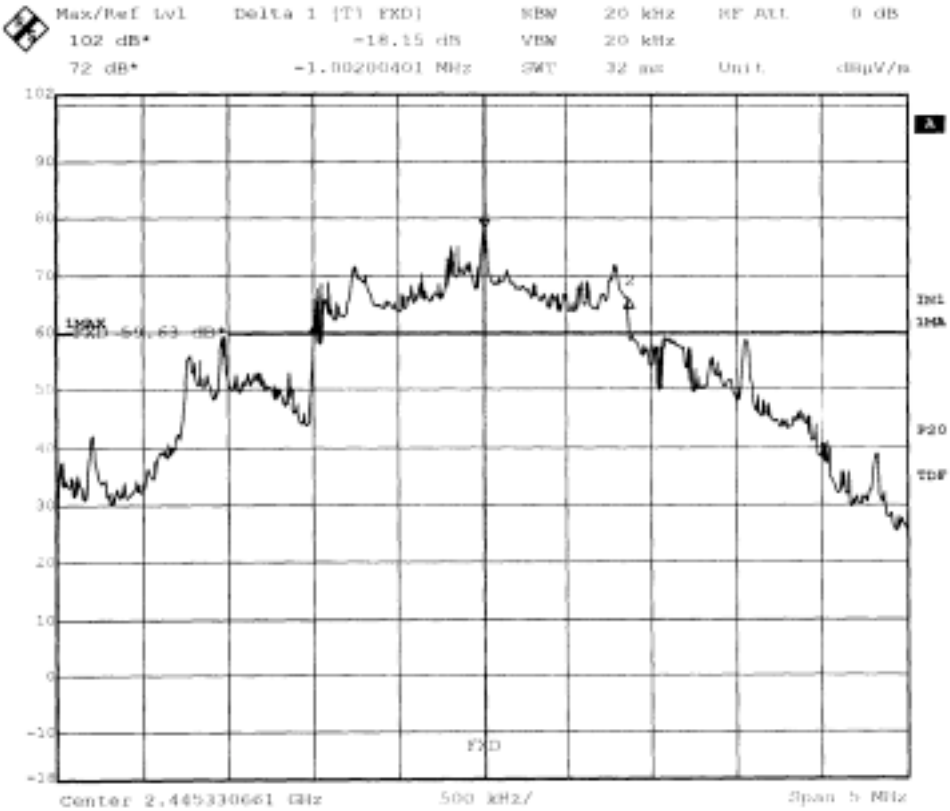
Test Conditions
Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting

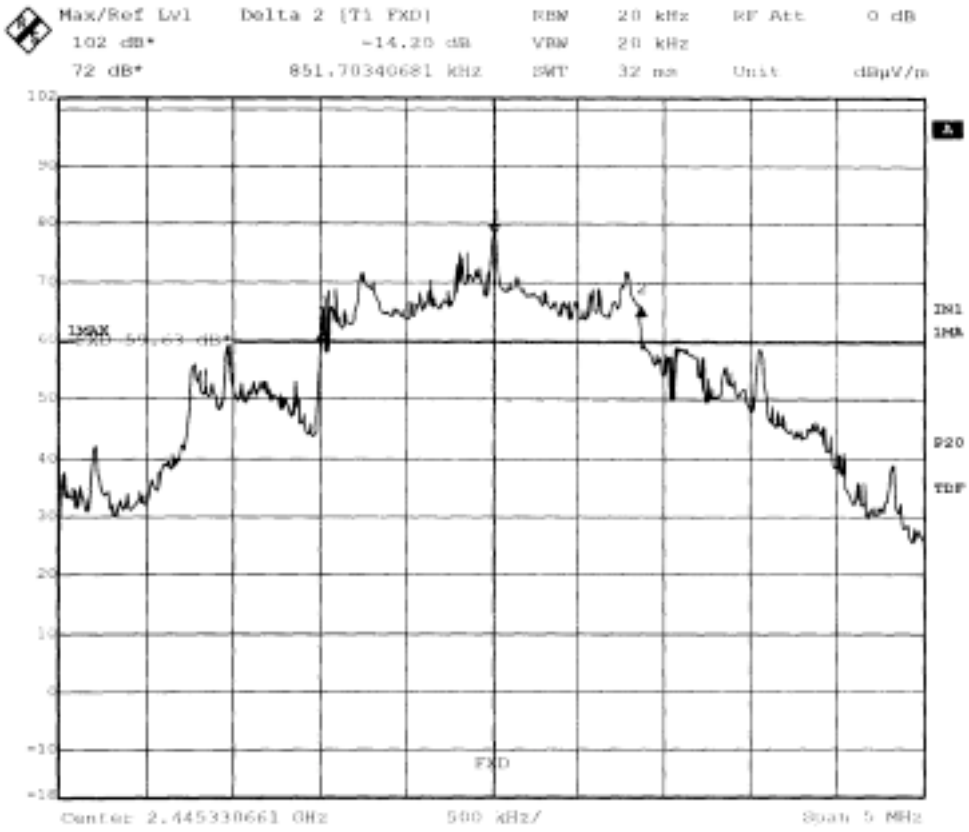
20dB Bandwidth		
No	Freq. (GHz)	Test Result (MHz)
1	2.404348697	1.122 + 0.842 = 1.964
2	2.445330661	1.002 + 0.852 = 1.854
3	2.480160320	0.992 + 0.864 = 1.856

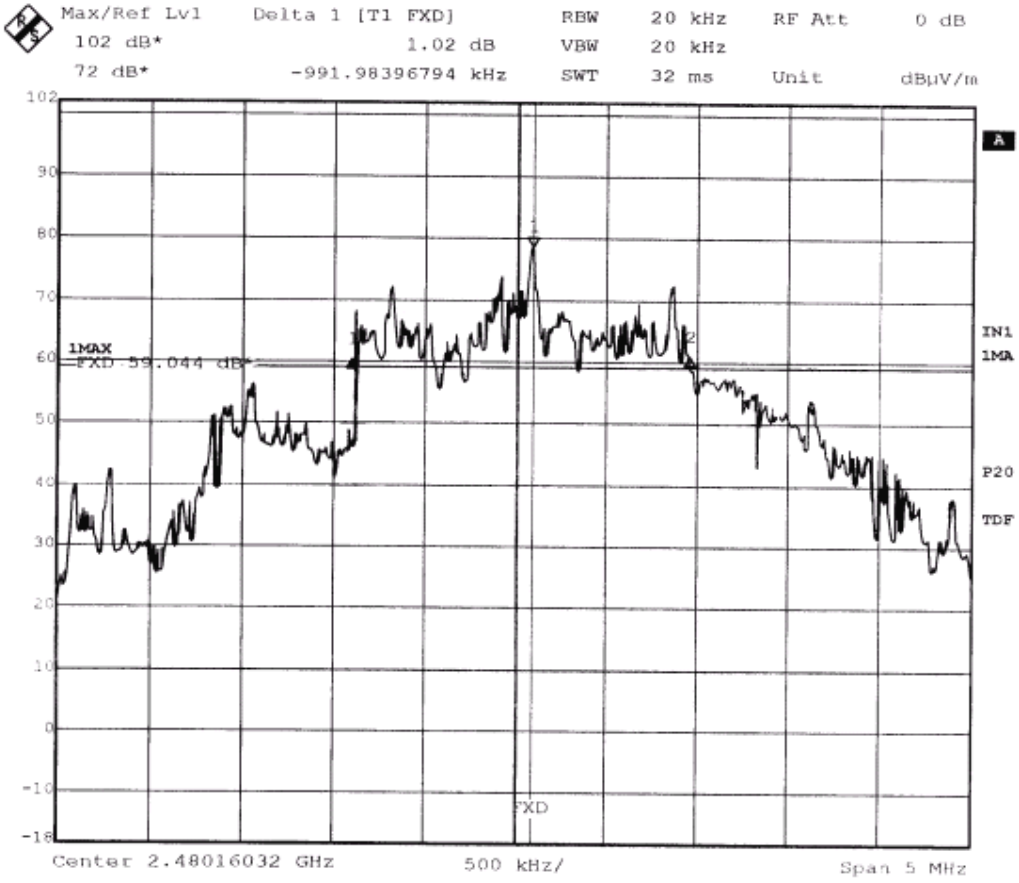
Scan Graph and Scan Settings



Delta 1 = 1.12224449 MHz
Delta 2 = 841.68336673 kHz


Max/Ref Lvl
102 dB*
72 dB*
Delta 1 [T1 FXD]
-18.15 dB
-1.00200401 MHz
RBW 20 kHz
VBW 20 kHz
SWT 32 ms
RF Att 0 dB
Unit dBµV/m
1MAX
FXD
IN1
IMA
P20
TDF
Center 2.445330661 GHz
500 kHz/
Span 5 MHz


Max/Ref Lvl
102 dB*
72 dB*
Delta 2 [T1 FXD]
-14.20 dB
851.70340681 kHz
RBW 20 kHz
VBW 20 kHz
SWT 32 ms
RF Att 0 dB
Unit dBµV/m
1MAX
FXD
IN1
IMA
P20
TDF
Center 2.445330661 GHz
500 kHz/
Span 5 MHz



Delta 1 = 992.08402546 kHz
Delta 2 = 863.75645982 kHz

4.6 Maximum Peak Output Power

RESULT : Pass

Test procedure : ANSI C63.4: 2003 and Public Notice DA 00-75
Frequency range : 2400-2483.5 MHz
Limits : Section 15.247(b)(1)
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

Test Setup:

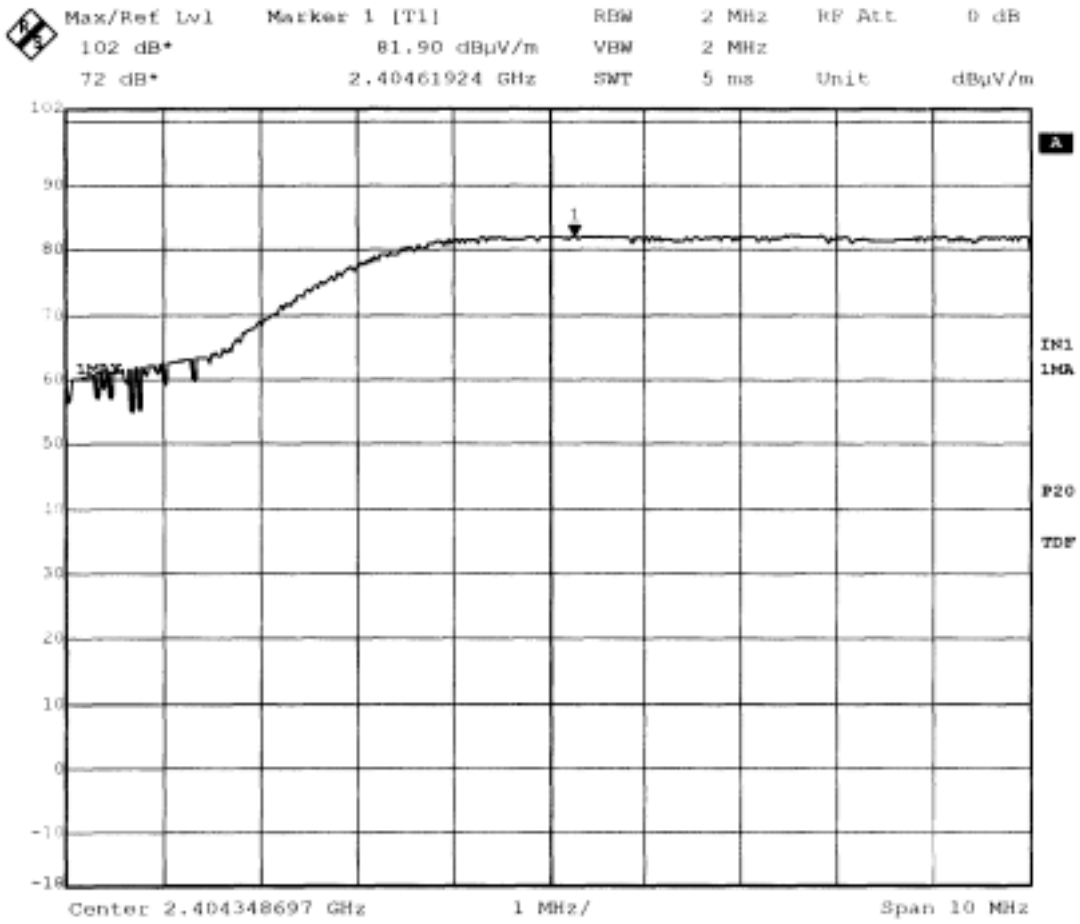
The maximum peak output power was measured with a spectrum analyzer. The EUT must have its hopping function enabled. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.

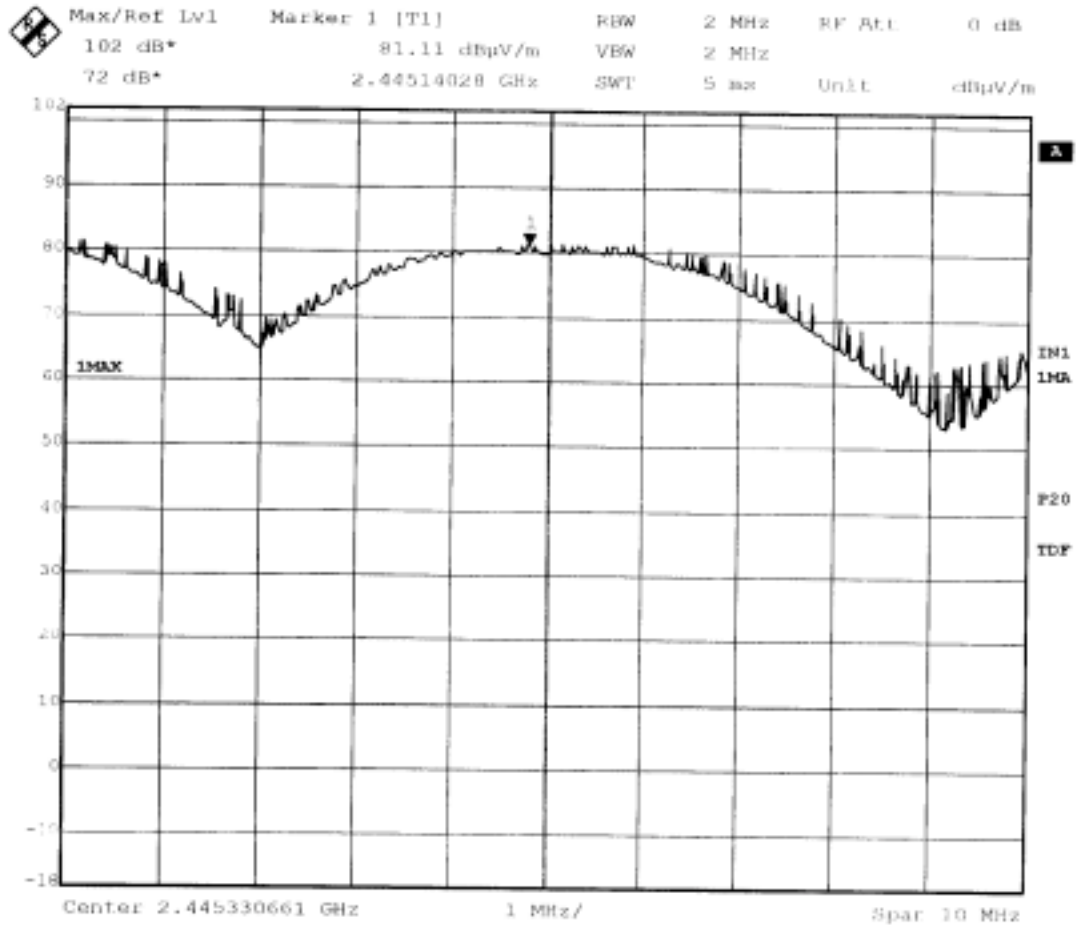
Test Results:

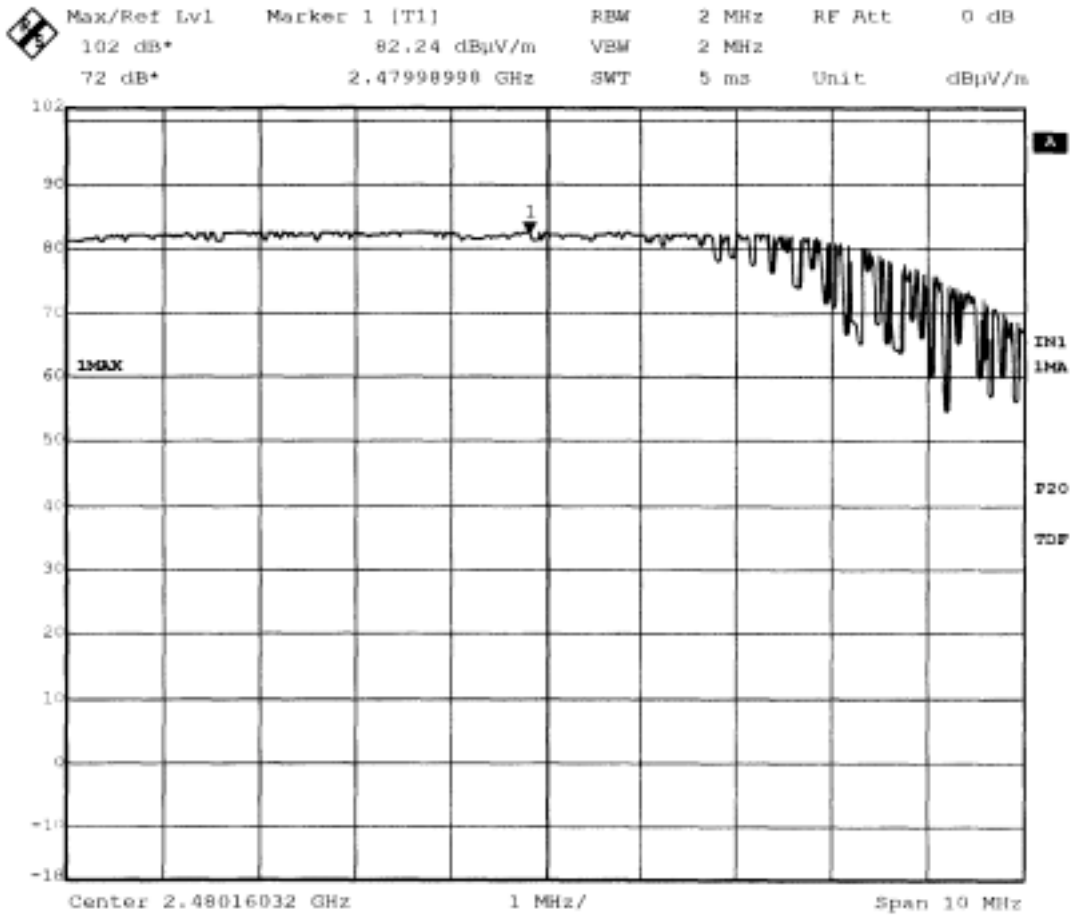
Test Conditions
Ambient Temperature : 25℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting

Maximum Peak Output Power					
No	Center Freq. (GHz)	Antenna Polarity	Test Result (dB μ V/m)	Test Result (mW)	Limits (mW)
1	2.404348697	H/ V	81.90	0.0490	125
2	2.445330661	H/ V	81.11	0.0408	125
3	2.480160320	H/ V	82.24	0.0528	125

Scan Graph and Scan Settings




Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
81.11 dBµV/m
2.44514028 GHz
RBW 2 MHz
VBW 2 MHz
SWT 5 ms
RF Att 0 dB
Unit dBµV/m
1MAX
IN1
1MA
P20
TDF
Center 2.445330661 GHz
1 MHz/
Span 10 MHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
82.24 dBµV/m
2.47998998 GHz
RBW 2 MHz
VBW 2 MHz
SWT 5 ms
RF Att 0 dB
Unit dBµV/m
1MAX
IN1
1MA
F20
TDF
Center 2.48016032 GHz
1 MHz/
Span 10 MHz

4.7 Band Edge Compliance

RESULT : Pass

Test procedure : ANSI C63.4: 2003 and Public Notice DA 00-75
Frequency range : 2400-2483.5 MHz
Limits : Section 15.247(c)
Test Site : 3m Anechoic Chamber (Registration Number: 102430)

Test Setup:

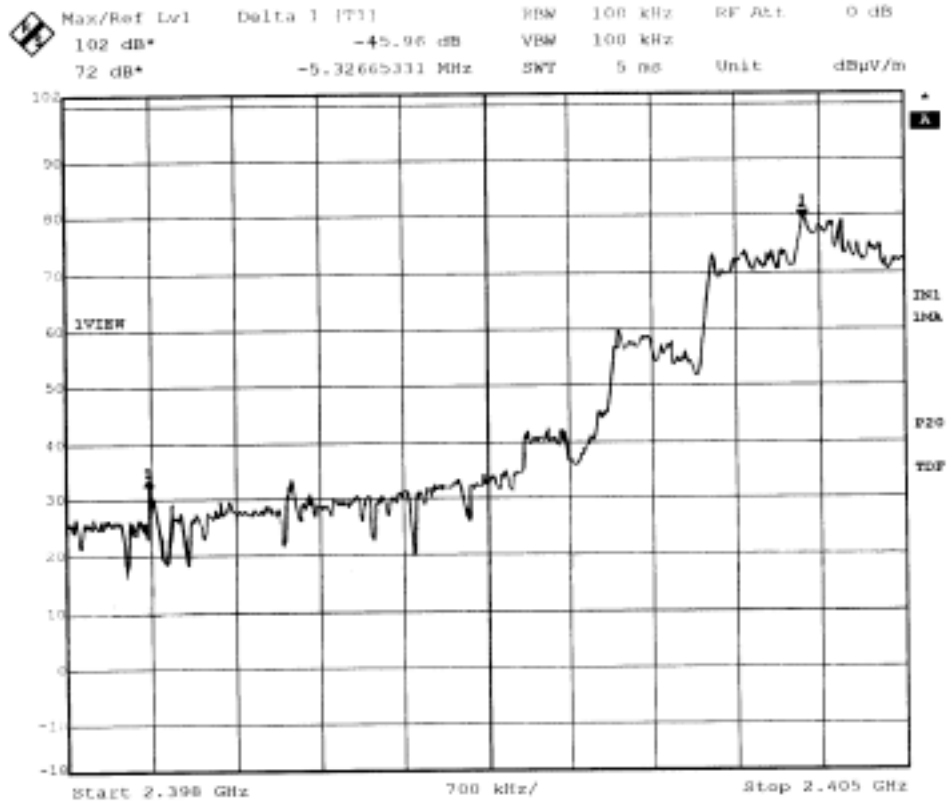
The band edge compliance was measured with a spectrum analyzer under hopping function enable. Allow the trace to stabilize. Set the marker on the emission at the band-edge, or on the highest modulation product outside of the band (if this level is greater than that at the band-edge). Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission.

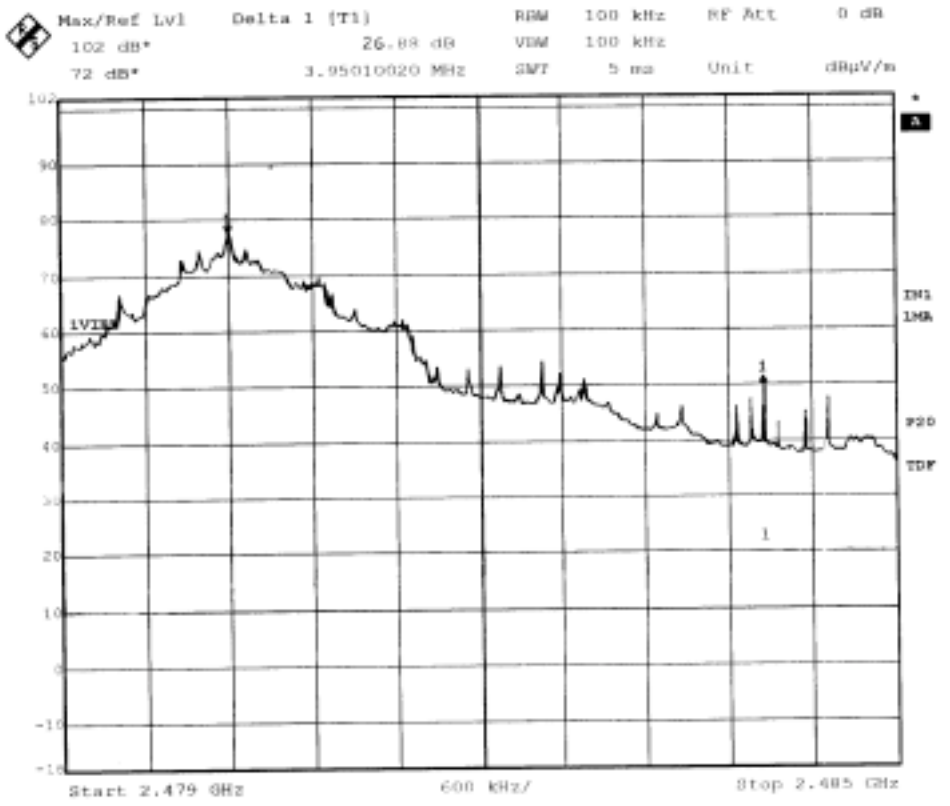
Test Results:

Test Conditions
Ambient Temperature : 25℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting

Band Edge Compliance			
Peak of the in-band emission (GHz)	Highest emission outside of the band (GHz)	Delta (dB)	Limit (dB)
2.4043	2.39882	45.96	> 20
2.4802	2.48404	26.88	> 20

Scan Graph and Scan Settings





4.8 Spurious Emission

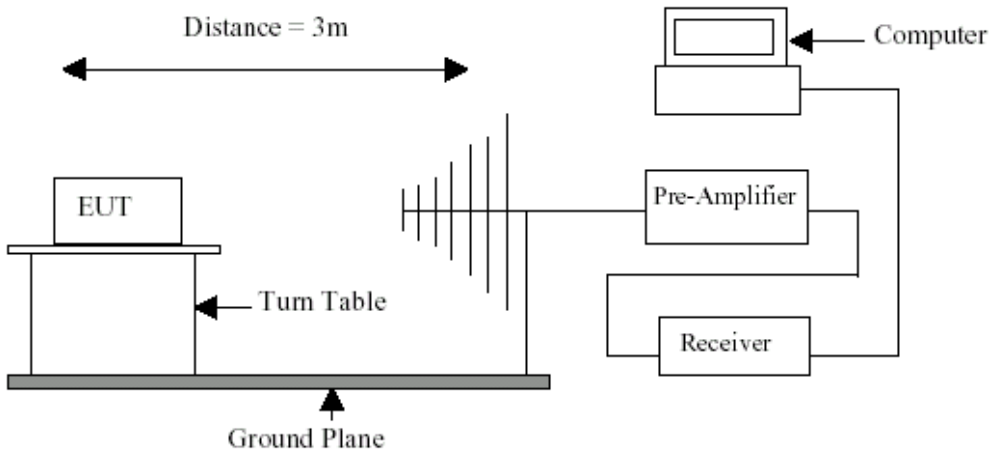
RESULT : Pass

Test procedure	:	ANSI C63.4: 2003 and Public Notice DA 00-75
Frequency range	:	Above 30MHz
Limits	:	Section 15.247(c)
Test Site	:	3m Anechoic Chamber (Registration Number: 102430)

Test Setup:

The EUT was placed on a wooden turntable, which could rotate from 0° to 360°, 0.8m high above the ground, at a distance of 3m in anechoic chamber, from the bi-direction transmission broadband antenna, which was mounted on the antenna tower. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results below.

Test Setup:



Transducer

3m, 26MHz~2GHz

Freq. (MHz)	3141 (3m) Value (dB)	Cable Value (dB)	Total Value (dB)
26	12.0	0.30	12.30
30	8.7	0.35	9.05
60	6.7	0.70	7.40
100	9.8	1.14	10.94
150	9.4	1.38	10.78
200	10.1	1.62	11.72
250	12.1	1.96	14.06
300	14.5	1.96	16.46
350	15.7	2.36	18.06
400	16.1	2.68	18.78
450	16.9	2.79	19.69
500	17.7	2.87	20.57
550	18.8	3.21	22.01
600	19.9	3.55	23.45
650	20.5	3.58	24.08
700	21.8	3.54	25.34
750	21.5	3.89	25.39
800	22.1	4.11	26.21
850	22.4	4.06	26.46
900	22.9	4.20	27.10
950	23.0	4.50	27.50
1000	24.1	4.56	28.66
1300	26.2	5.00	31.20
1700	27.2	6.00	33.20
2000	30.3	7.00	37.30

3m, 1GHz-18GHz

Freq. (MHz)	3115 (3m) Value (dB)	Cable) Value (dB)	Total Value (dB)
1000	4.36	1.00	5.36
1500	5.71	1.15	6.86
2000	9.33	1.30	10.63
3000	10.62	1.50	12.12
4000	12.32	1.80	14.12
5000	11.86	1.90	13.76
6000	13.06	2.10	15.16
7000	14.58	2.20	16.78
8000	14.23	2.55	18.88
9000	17.98	2.70	20.68
10000	17.58	3.10	21.85
11000	18.75	3.30	22.05
12000	18.71	3.40	22.11
13000	19.81	3.50	23.31
14000	20.91	3.60	24.51
15000	19.71	3.70	23.41
16000	19.51	3.80	23.31
17000	23.81	3.90	27.71
18000	28.21	4.00	32.21

Note for Transducer Factor:

Correction Factor included Antenna Factor and Cable Attenuation. All factors were inputted into the ESI 26 testing receiver, for frequencies between the known sampling points the transducer factor is approximated using modified spline interpolation by software of ESI 26. So, the readings displayed in the graphs are the final testing results we needed without any calculation.

Radiated Emissions limits, general requirements [FCC 47 CFR 15.209]:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1GHz are based on measurements employing an average detector.

The field strength of emissions appearing within restricted bands of operation shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions.

Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit above. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100ms), in an effort to demonstrate compliance with the above limit.

Test Results:

Test Conditions:

Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting.

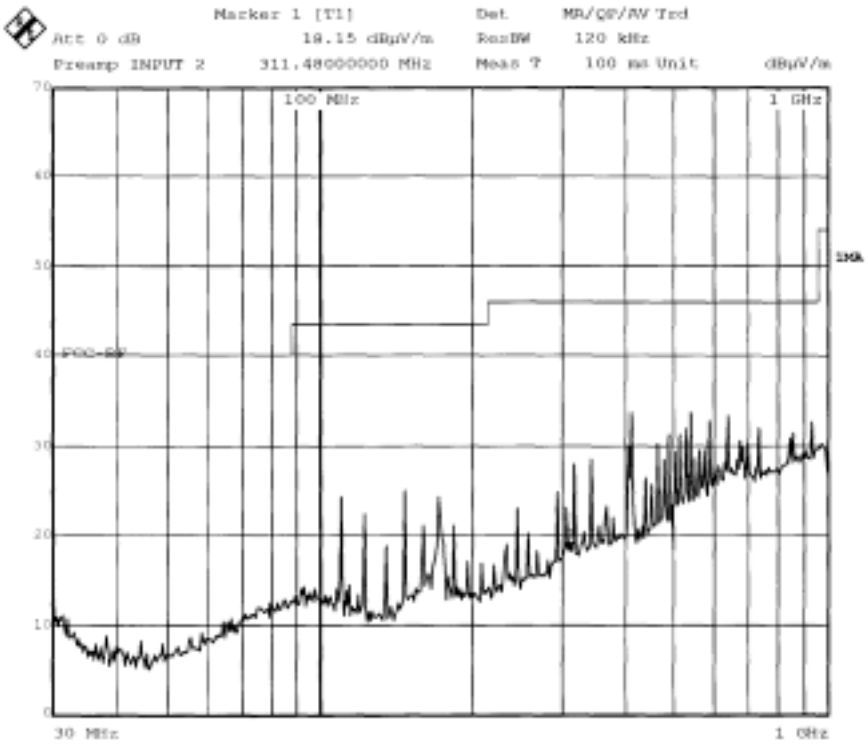
Radiated Emissions (30MHz~1GHz) (QP detector)					
Description	Freq. (MHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Spurious emission	147.44	H	7.3	43.5	150
Spurious emission	413.64	H	14.6	46.0	200
Spurious emission	468.90	V	15.2	46.0	200
Spurious emission	540.68	H	18.1	46.0	200
Spurious emission	800.00	V	17.5	46.0	200

Remark:
Calculated measurement uncertainty: 5.9dB (30MHz ~ 1GHz)

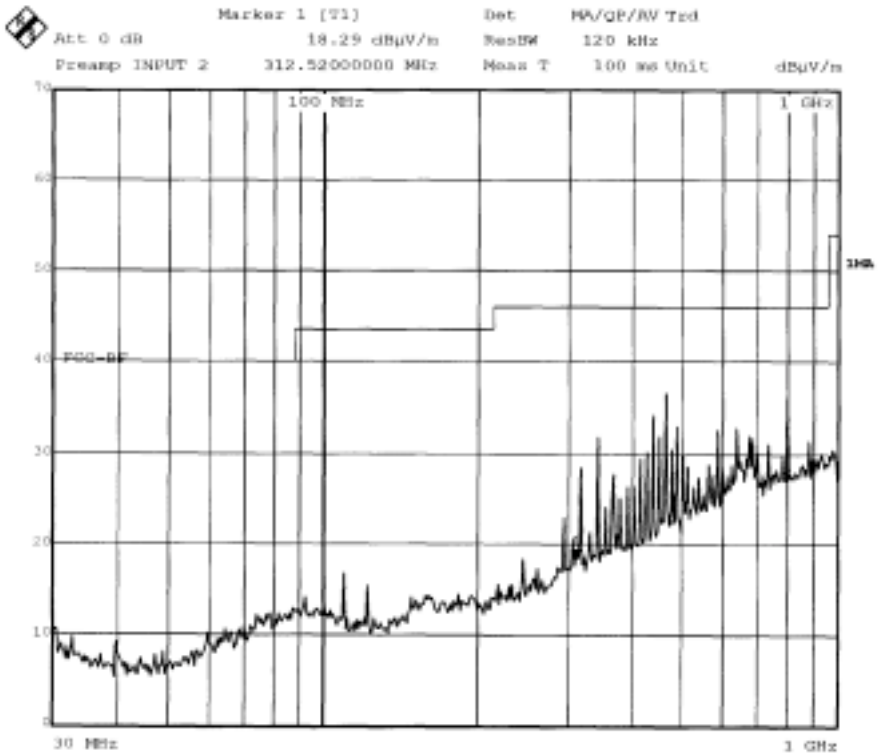
Scan Graph and Scan Settings

(30MHz~1GHz)

Transmitting (Horizontal)



Transmitting (Vertical)



Test Results of Channel 2.4043GHz:

Test Conditions:

Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting .

Radiated Emissions (>1 GHz) (PK detector)					
Description	Freq. (GHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Harmonics 2	4.4086	H/V	44.87	54.0	500
Harmonics 3	7.2129	H/V	<51.96	54.0	500
Harmonics 4	9.6172	H/V	<51.96	54.0	500
Harmonics 5	12.0215	H/V	<51.96	54.0	500
Harmonics 6	14.4258	H/V	<51.96	54.0	500
Harmonics 7	16.8301	H/V	<51.96	54.0	500
Harmonics 8	19.2344	H/V	< 54.0	54.0	500
Harmonics 9	21.6387	H/V	< 54.0	54.0	500
Harmonics 10	24.043	H/V	< 54.0	54.0	500
Spurious emission	/	H/V	<51.96	54.0	500

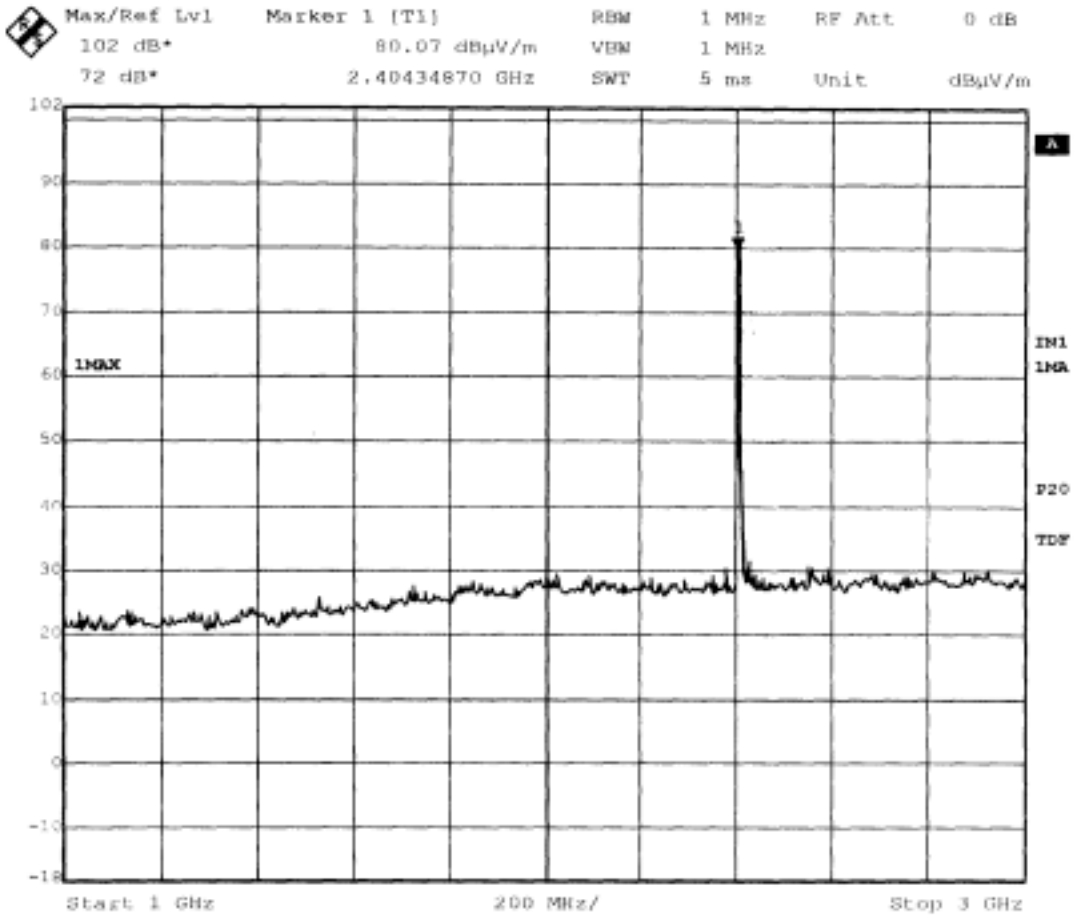
Radiated Emissions (>1 GHz) Peak level corrected by setting the VBW to 10 Hz					
Description	Freq. (MHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Harmonics 2	4.4086	H/V	35.95	54.0	500
Spurious emission	/	H/V	<50.64	54.0	500

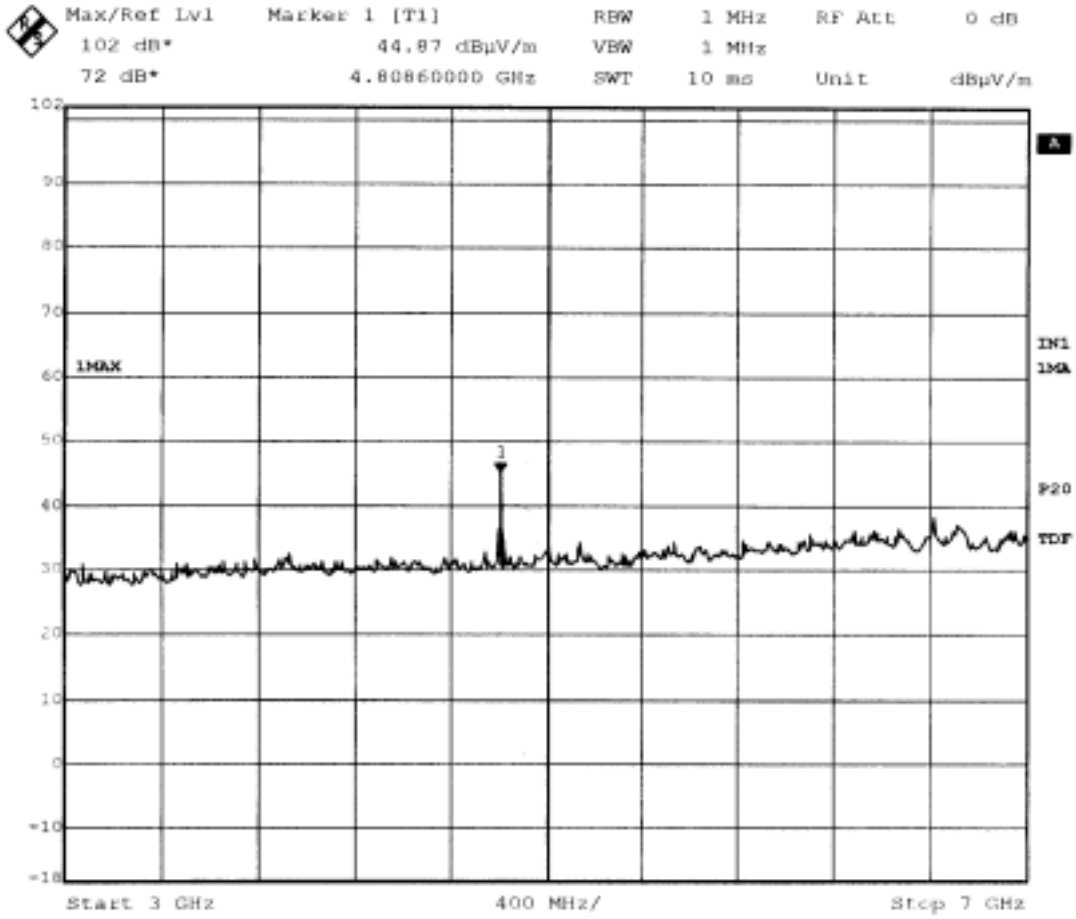
Note: The peak levels are compliance with the 15.209 limits even though without adjusted by a “duty cycle correction factor”.

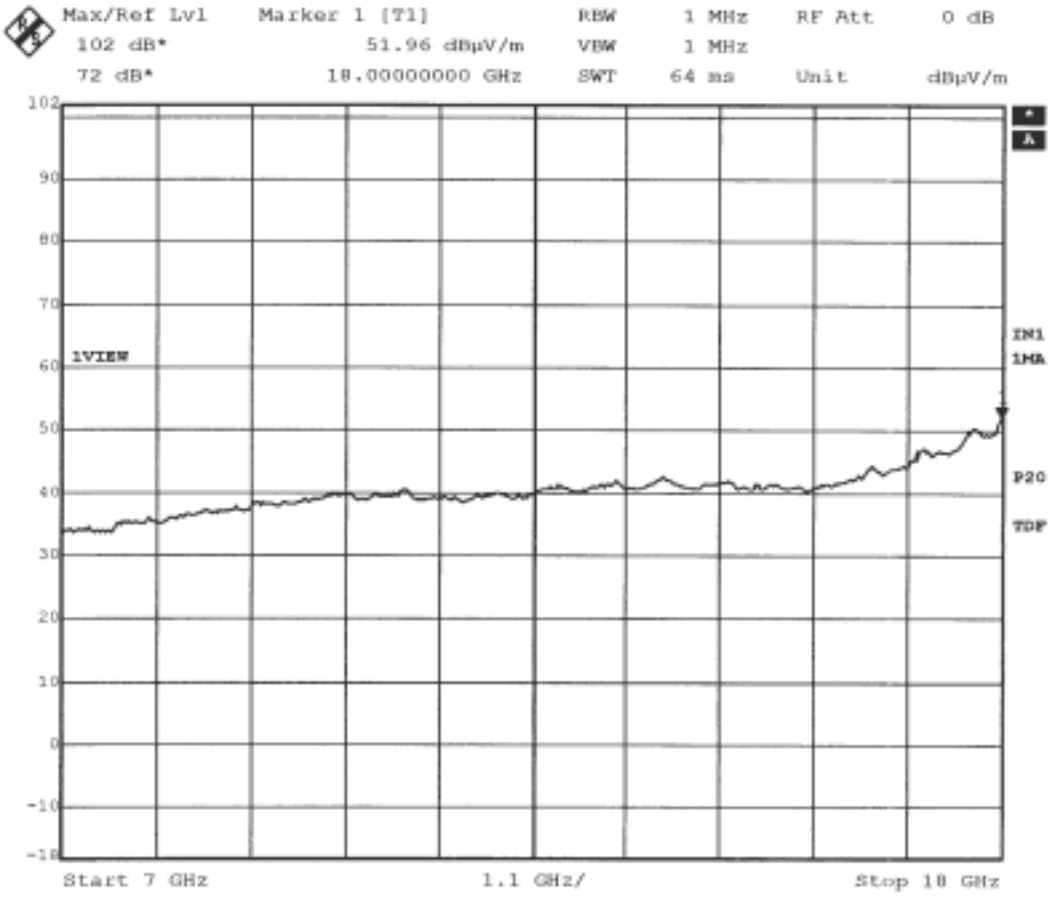
Statement: No spurious emission above 18GHz was found.

Scan Graph and Scan Settings

Transmitting (Horizontal/Vertical)

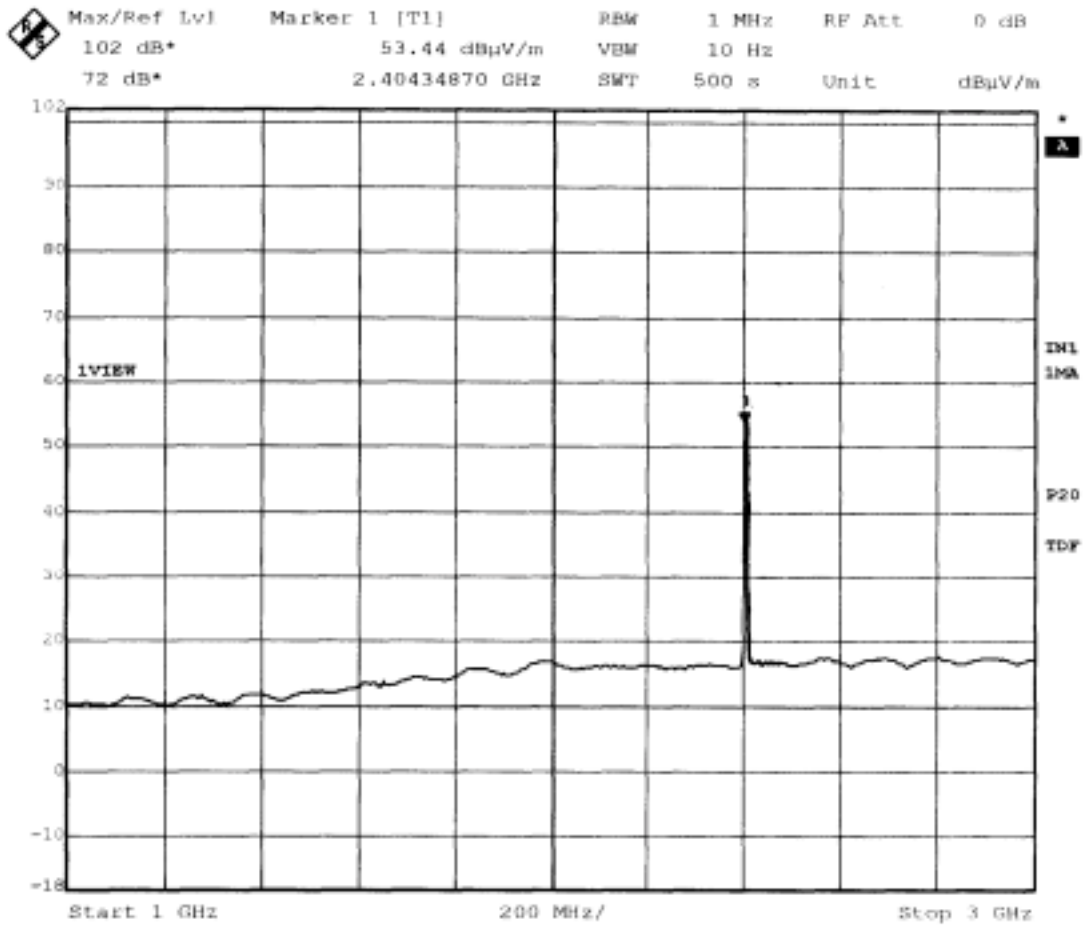


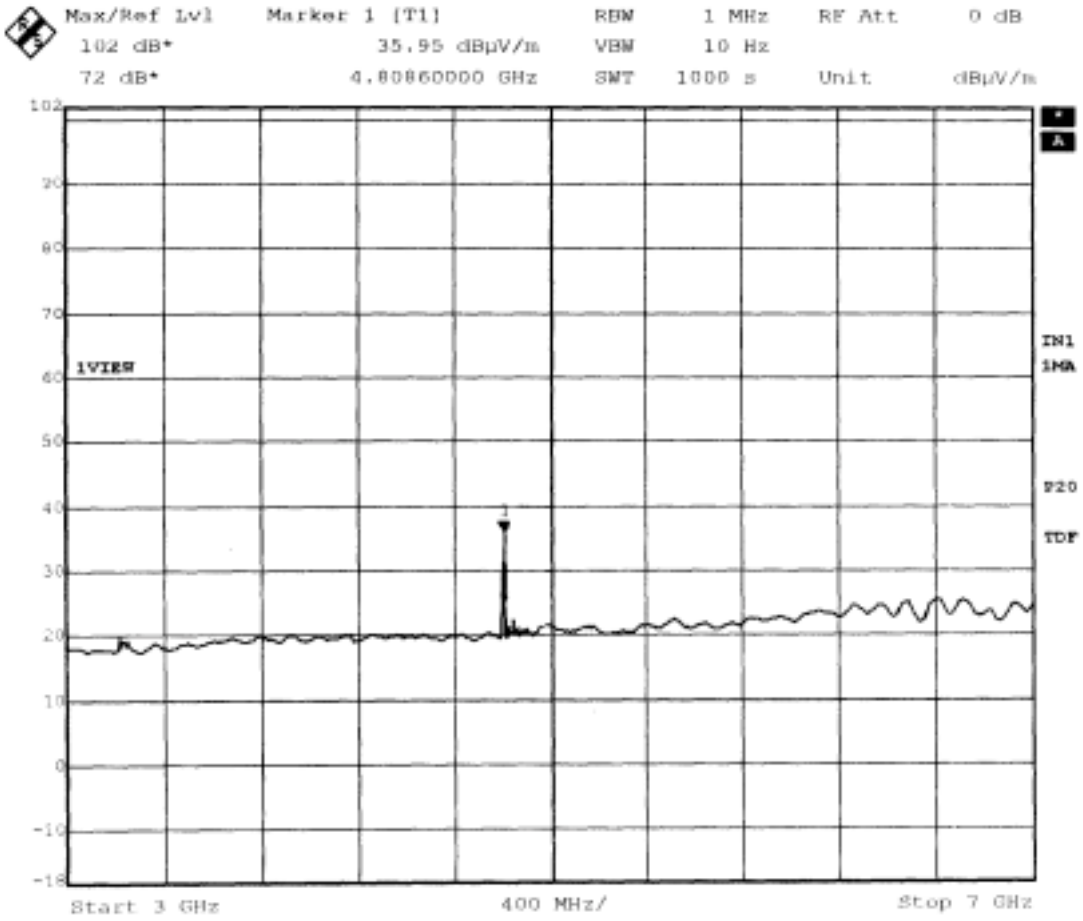

Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
44.87 dBµV/m
4.80860000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
RF Att 0 dB
Unit dBµV/m
102
90
80
70
60
50
40
30
20
10
0
-10
-18
1MAX
1
A
IN1
1MA
P20
TDF
Start 3 GHz
400 MHz/
Stop 7 GHz

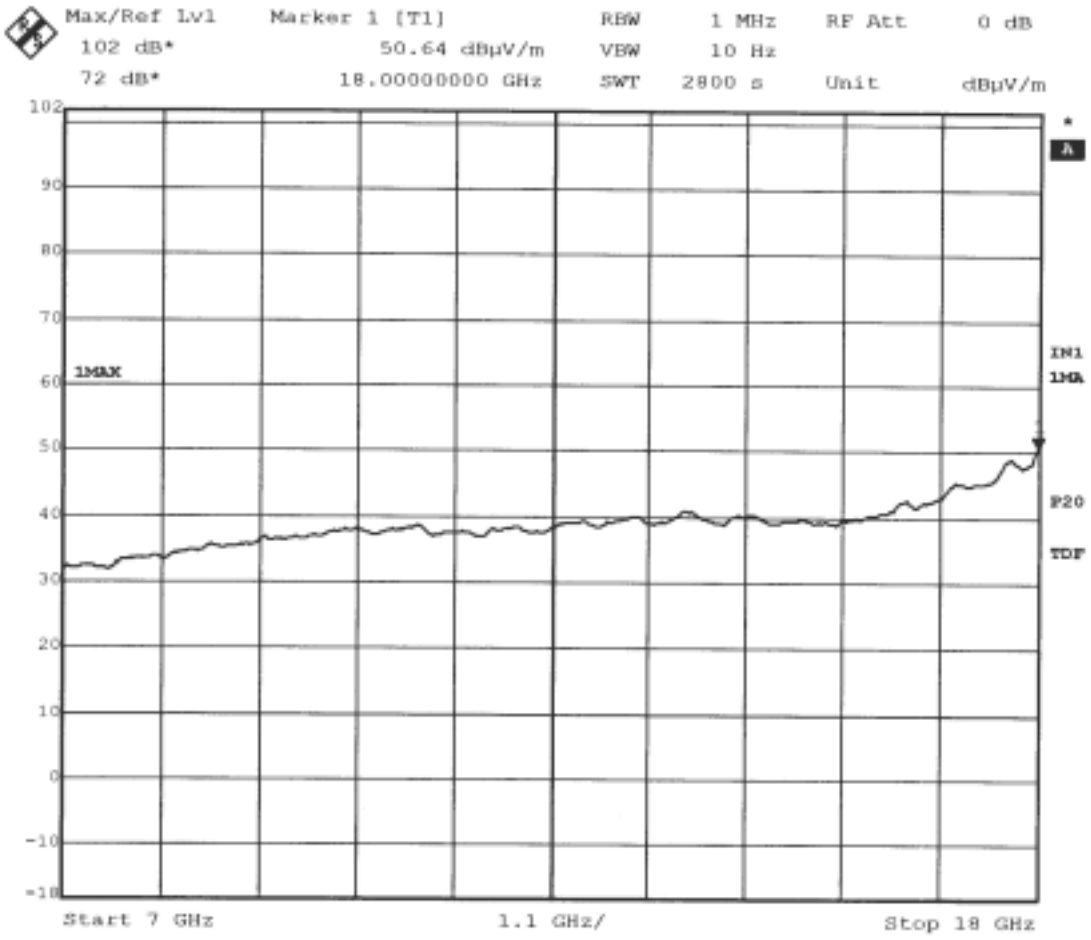

Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
51.96 dBµV/m
18.00000000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 64 ms
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
1MA
P20
TDF
Start 7 GHz
1.1 GHz/
Stop 18 GHz

Transmitting (Horizontal/Vertical)

(Peak level corrected by setting the VBW to 10 Hz)




Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
35.95 dBµV/m
4.80860000 GHz
RBW 1 MHz
VBW 10 Hz
SWT 1000 s
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
1MA
P20
TDF
Start 3 GHz
400 MHz/
Stop 7 GHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
50.64 dBµV/m
18.00000000 GHz
RBW 1 MHz
VBW 10 Hz
SWT 2800 s
RF Att 0 dB
Unit dBµV/m
102
90
80
70
60
50
40
30
20
10
0
-10
-18
1MAX
IN1
1MA
P20
TDF
Start 7 GHz
1.1 GHz/
Stop 18 GHz

Test Results of Channel 2.4453 GHz:

Test Conditions:

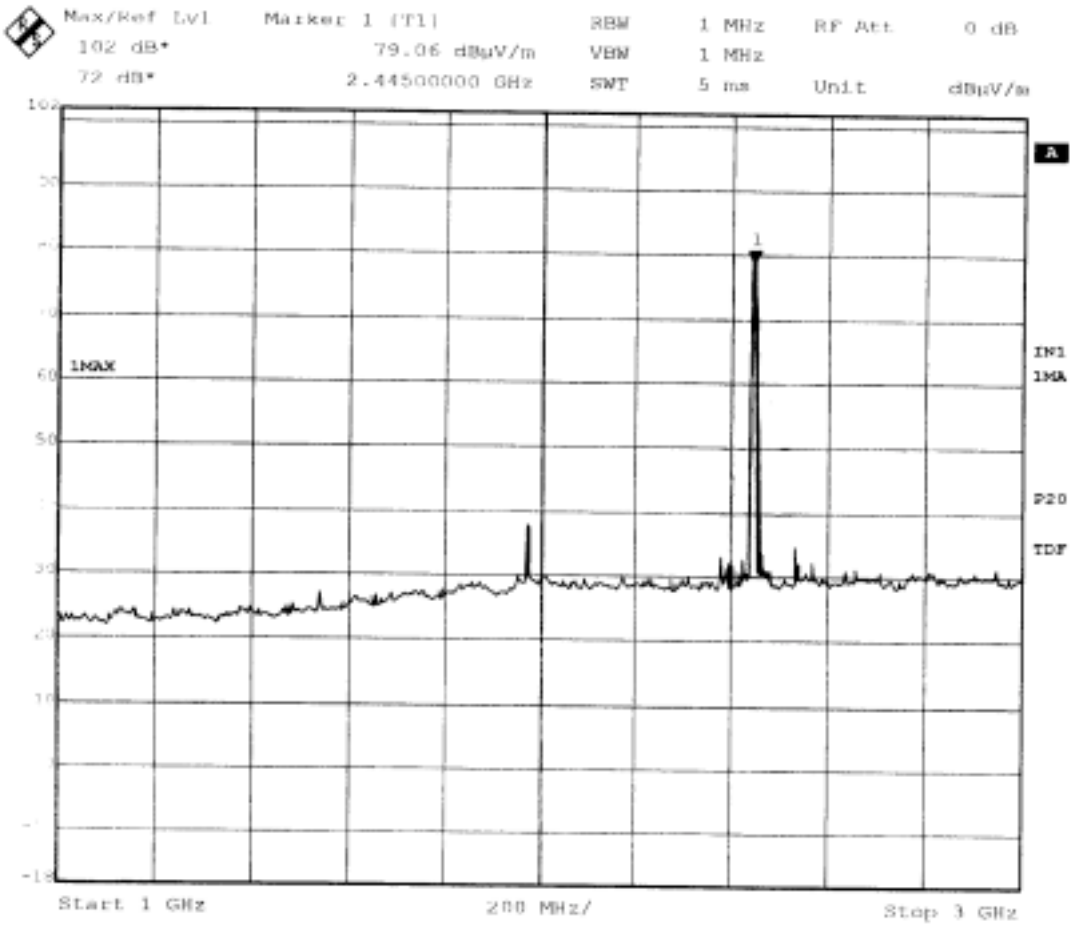
Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting .

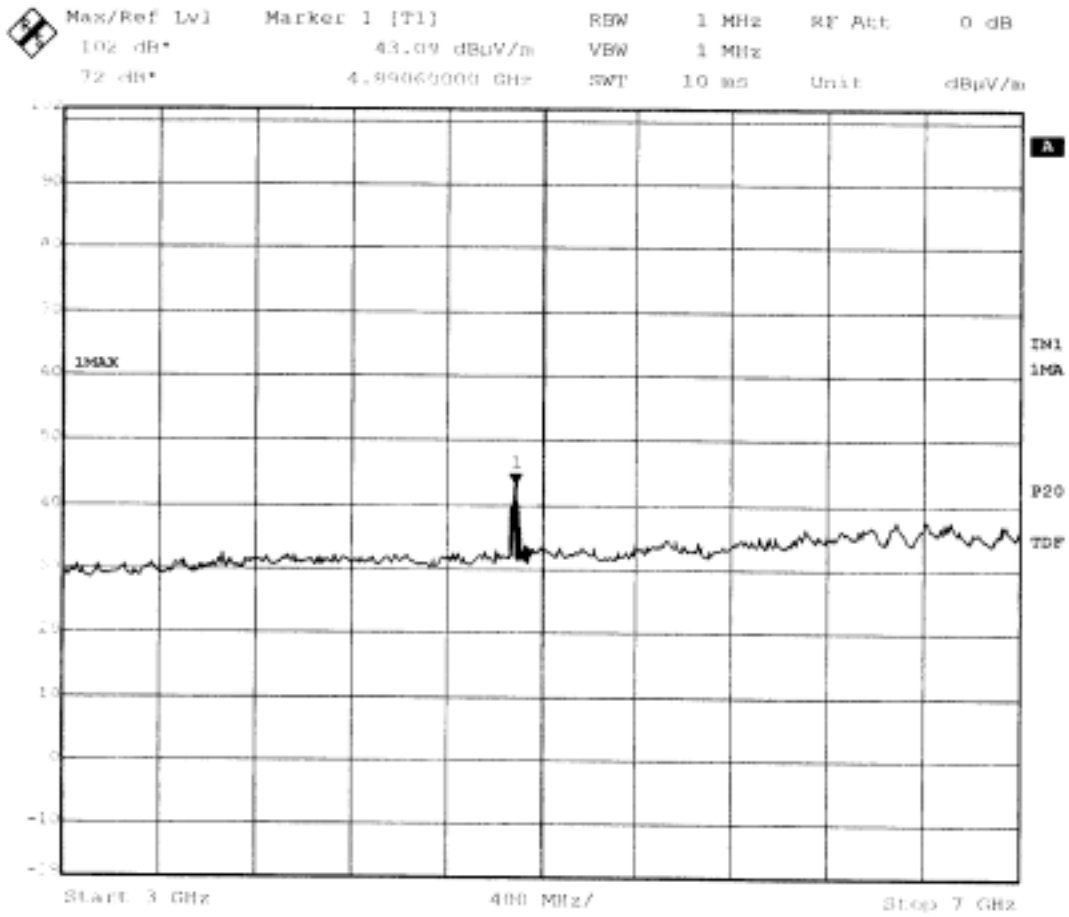
Radiated Emissions (>1 GHz) (PK detector)					
Description	Freq. (GHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Harmonics 2	4.8906	H/V	43.09	54.0	500
Harmonics 3	7.3359	H/V	<52.09	54.0	500
Harmonics 4	9.7812	H/V	<52.09	54.0	500
Harmonics 5	12.2265	H/V	<52.09	54.0	500
Harmonics 6	14.6718	H/V	<52.09	54.0	500
Harmonics 7	17.1171	H/V	<52.09	54.0	500
Harmonics 8	19.5624	H/V	< 54.0	54.0	500
Harmonics 9	22.0077	H/V	< 54.0	54.0	500
Harmonics 10	24.453	H/V	< 54.0	54.0	500
Spurious emission	1.9720	H/V	37.52	54.0	500
Spurious emission	2.4891	H/V	37.44	54.0	500
Other Spurious emission	/	H/V	<52.09	54.0	500

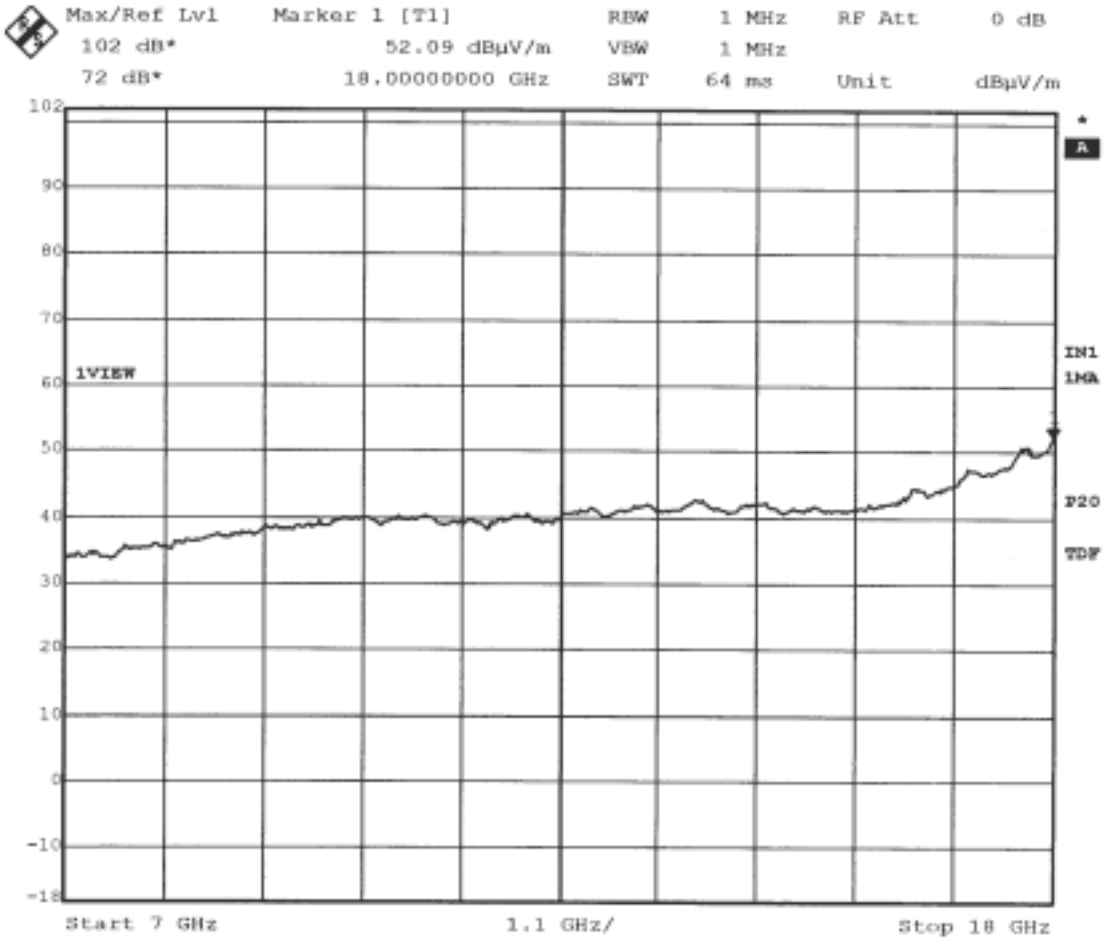
Radiated Emissions (>1 GHz) Peak level corrected by setting the VBW to 10 Hz					
Description	Freq. (MHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Harmonics 2	4.8292	H/V	29.00	54.0	500
Spurious emission	1.9720	H/V	19.00	54.0	500
Other Spurious emission	/	H/V	<50.48	54.0	500

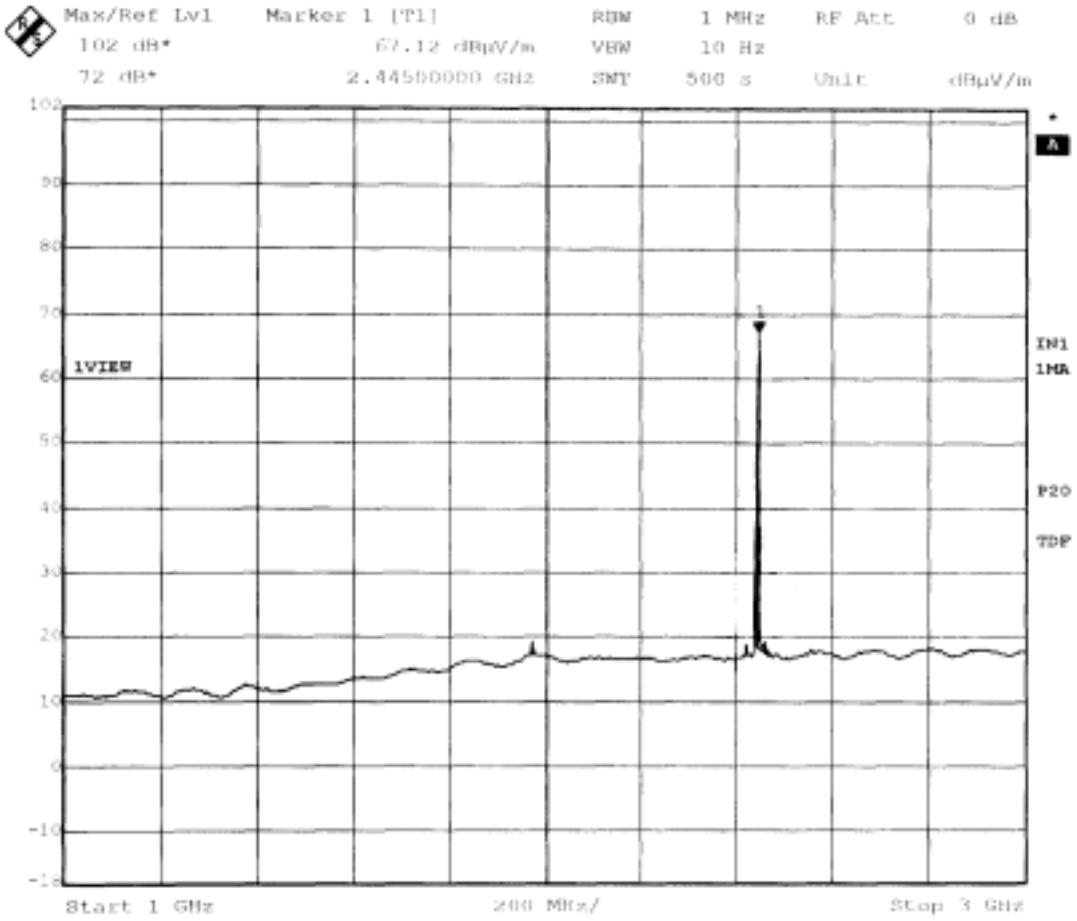
Note: The peak levels are compliance with the 15.209 limits even though without adjusted by a “duty cycle correction factor”.

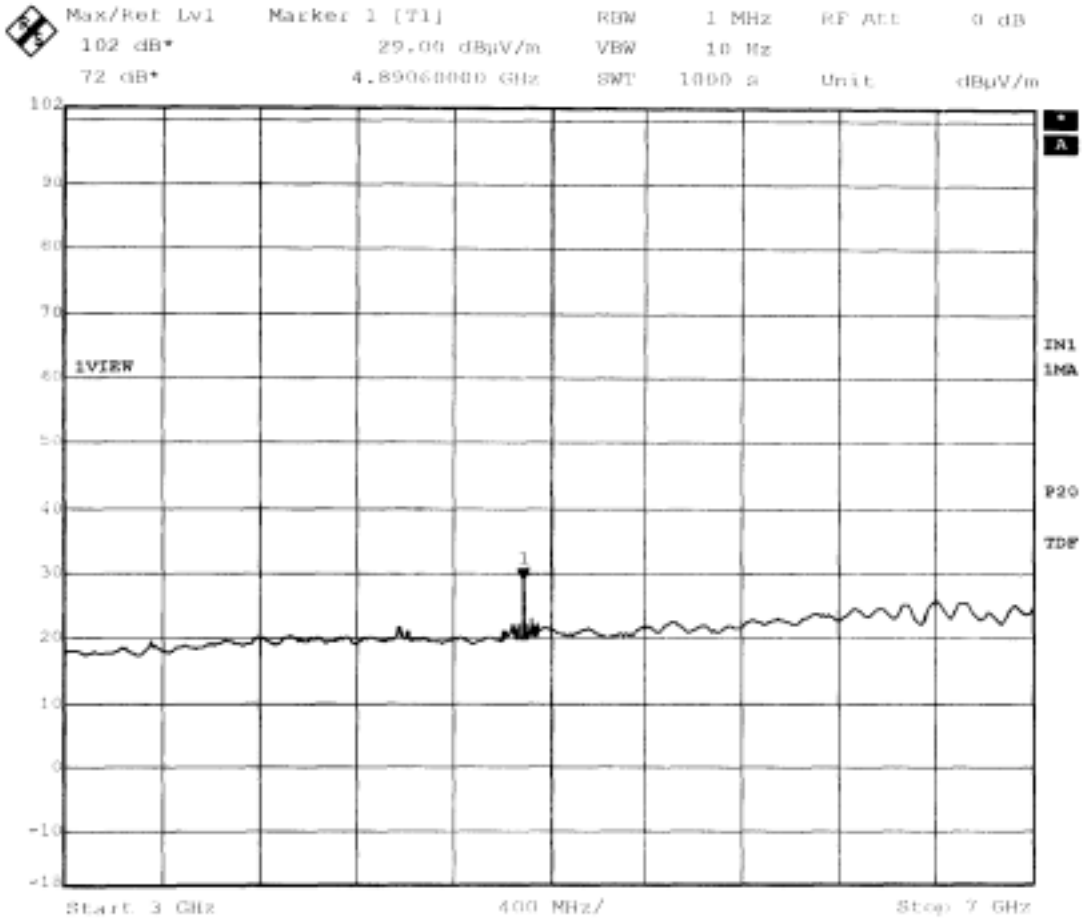
Statement: No spurious emission above 18GHz was found.

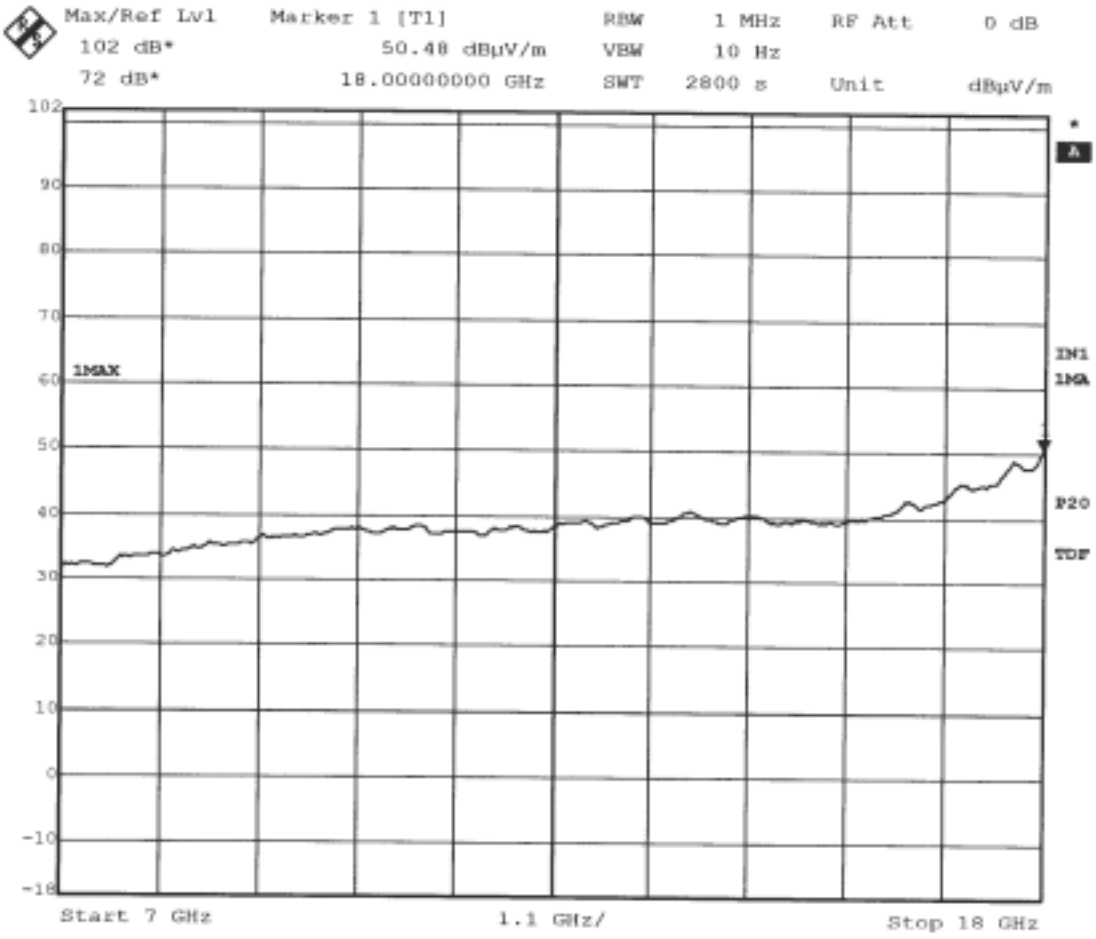

Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
79.06 dBµV/m
2.44500000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 5 ms
RF Att 0 dB
Unit dBµV/m
1MAX
IN1
1MA
P20
TDF
Start 1 GHz
200 MHz/
Stop 3 GHz


Max/Ref Lvl
Marker 1 [T1]
RBW 1 MHz
RF Att 0 dB
VBW 1 MHz
SWT 10 ms
Unit dBµV/m
1MAX
1
A
IN1
1MA
P20
TDF
Start 3 GHz
400 MHz/
Stop 7 GHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
52.09 dBµV/m
18.00000000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 64 ms
RF Att 0 dB
Unit dBµV/m
102
90
80
70
60
50
40
30
20
10
0
-10
-18
1VIEW
IN1
1MA
P20
TDF
Start 7 GHz
1.1 GHz/
Stop 18 GHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
67.12 dBµV/m
2.44500000 GHz
RBW 1 MHz
VBW 10 Hz
SWT 500 s
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
1MA
P20
TDF
Start 1 GHz
200 MHz/
Stop 3 GHz


Max/Ref Lvl
102 dBµ*
72 dBµ*
Marker 1 [T1]
29.00 dBµV/m
4.89060000 GHz
RBW 1 MHz
VBW 10 Hz
SWT 1000 s
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
IMA
P20
TDF
Start 3 GHz
400 MHz/
Stop 7 GHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
50.48 dBµV/m
18.00000000 GHz
RBW 1 MHz
VBW 10 Hz
SWT 2800 s
RF Att 0 dB
Unit dBµV/m
102
90
80
70
60
50
40
30
20
10
0
-10
-18
1MAX
1N1
1N&
P20
TDF
Start 7 GHz
1.1 GHz/
Stop 18 GHz

Test Results of Channel 2.48016 GHz:

Test Conditions:

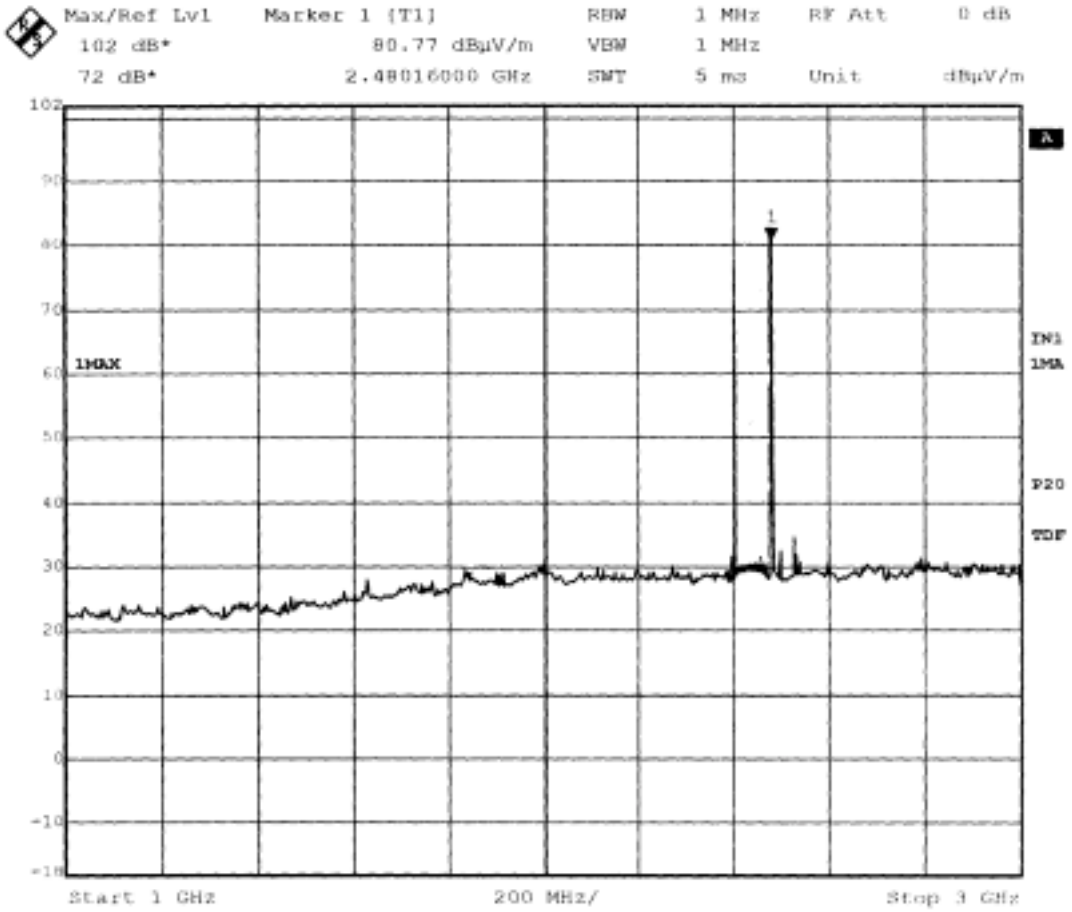
Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting .

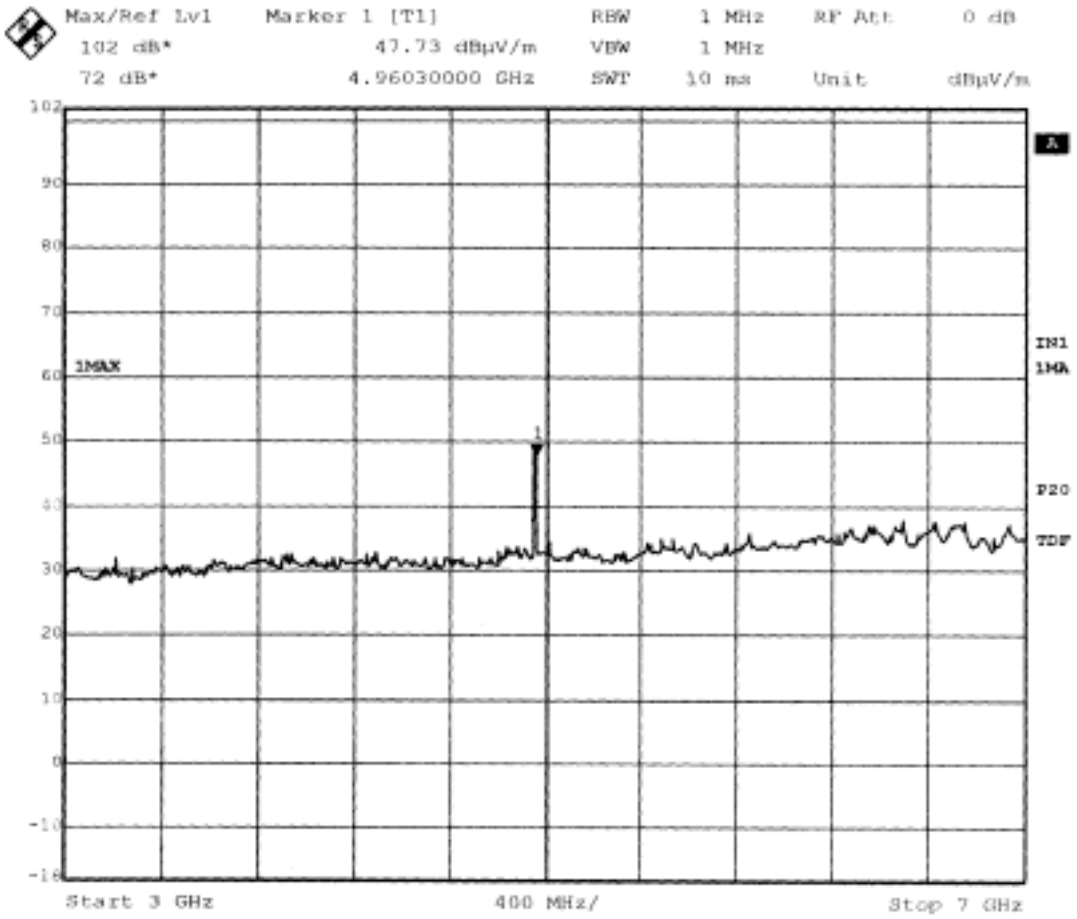
Radiated Emissions (>1 GHz) (PK detector)					
Description	Freq. (GHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Harmonics 2	4.9603	H/V	47.73	54.0	500
Harmonics 3	7.4405	H/V	<51.96	54.0	500
Harmonics 4	9.9206	H/V	<51.96	54.0	500
Harmonics 5	12.401	H/V	<51.96	54.0	500
Harmonics 6	14.881	H/V	<51.96	54.0	500
Harmonics 7	17.361	H/V	<51.96	54.0	500
Harmonics 8	19.841	H/V	< 54.0	54.0	500
Harmonics 9	22.321	H/V	< 54.0	54.0	500
Harmonics 10	24.802	H/V	< 54.0	54.0	500
Spurious emission	2.546	H/V	35.12	54.0	500
Other Spurious emission	/	H/V	<51.96	54.0	500

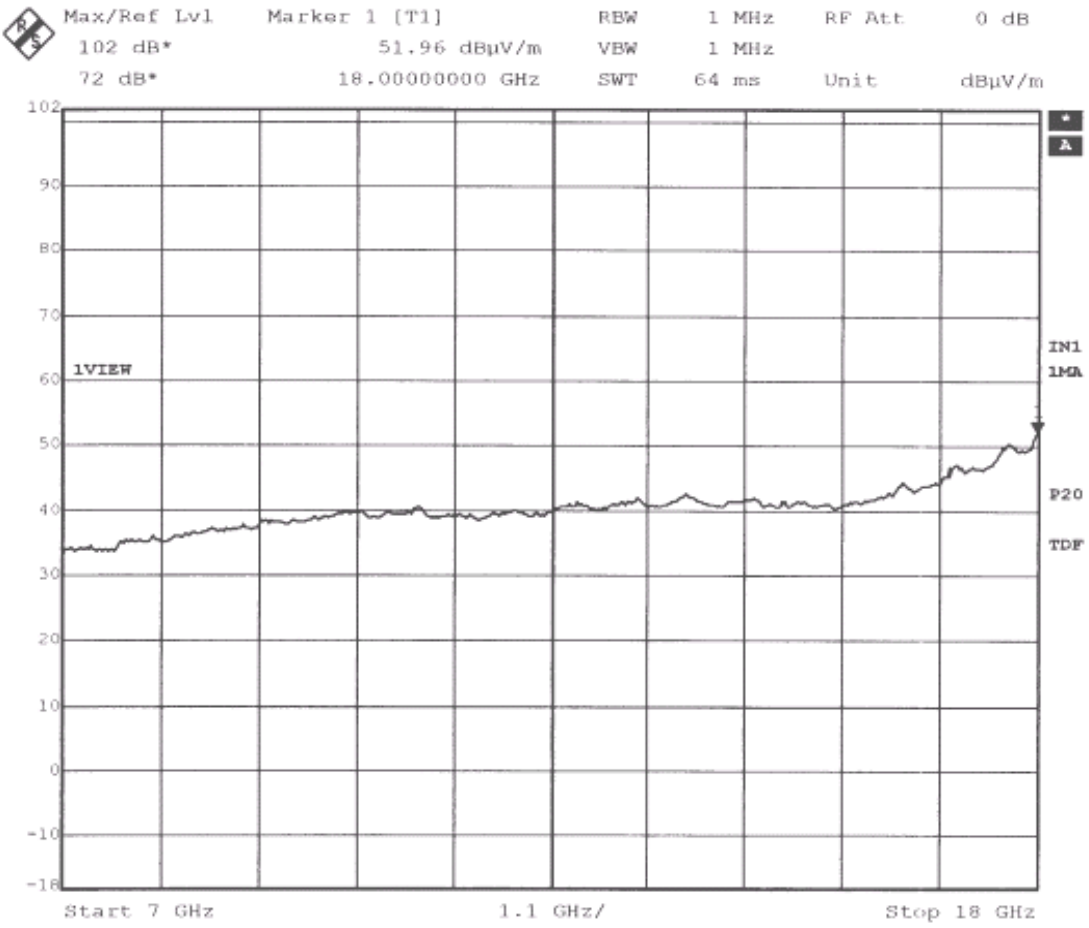
Radiated Emissions (>1 GHz) Peak level corrected by setting the VBW to 10 Hz					
Description	Freq. (MHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Harmonics 2	4.9603	H/V	40.79	54.0	500
Spurious emission	/	H/V	<50.64	54.0	500

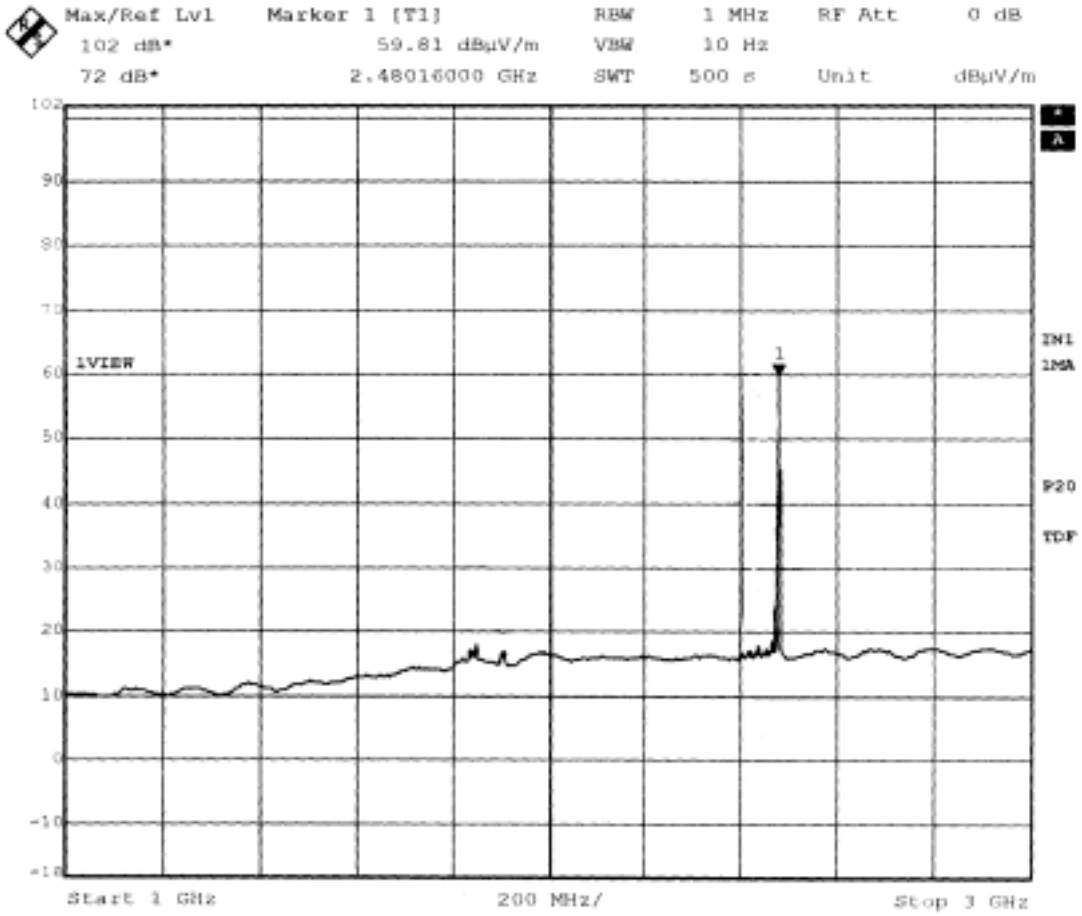
Note: The peak levels are compliance with the 15.209 limits even though without adjusted by a “duty cycle correction factor”.

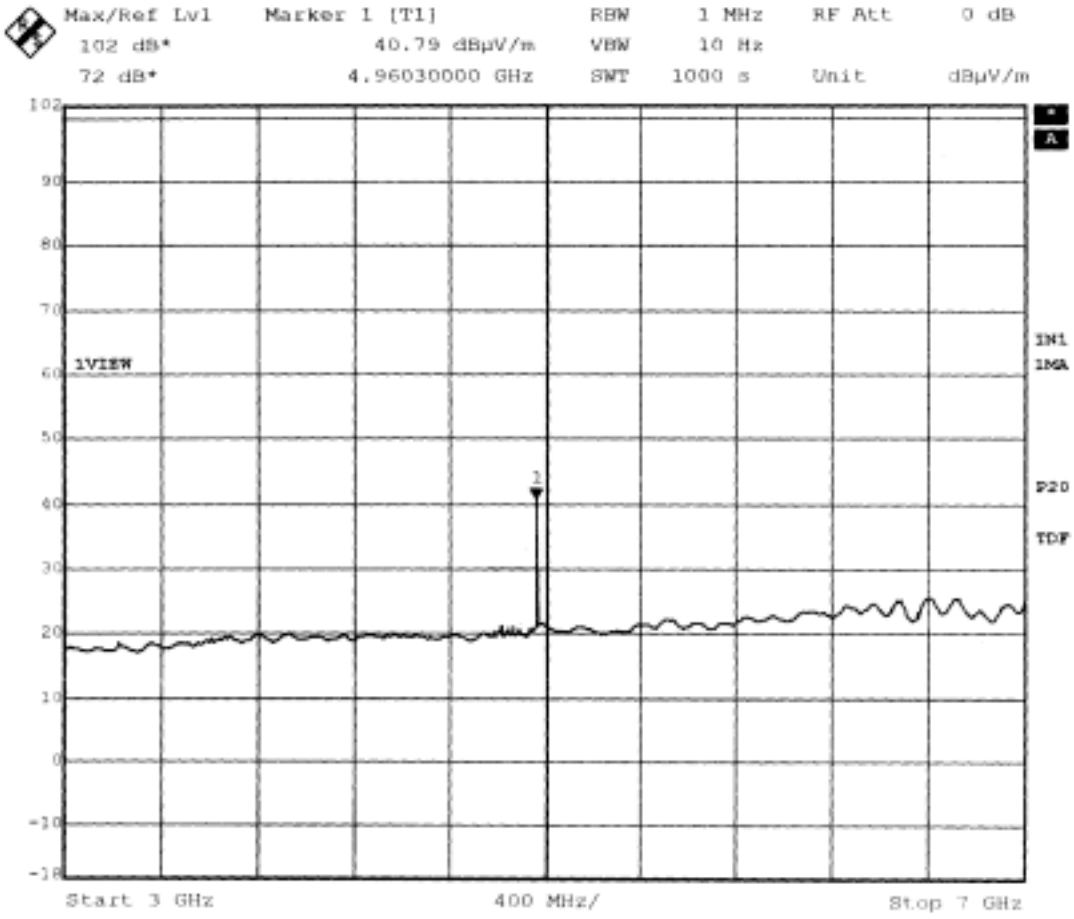
Statement: No spurious emission above 18GHz was found.

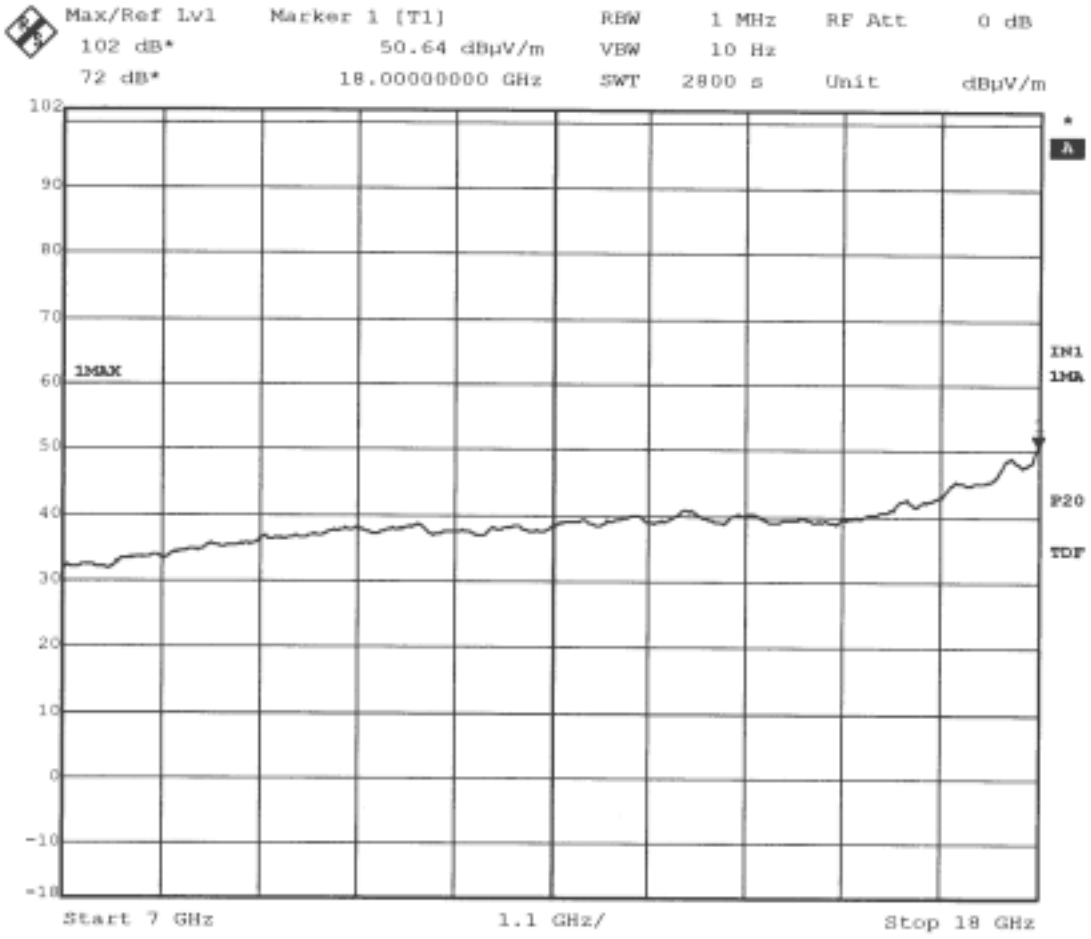

Max/Ref Lvl
102 dBµ*
72 dBµ*
Marker 1 [T1]
80.77 dBµV/m
2.48016000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 5 ms
RF Att 0 dB
Unit dBµV/m
1MAX
1
A
IN1
1MA
P20
TDF
Start 1 GHz
200 MHz/
Stop 3 GHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
47.73 dBµV/m
4.96030000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 10 ms
RF Att 0 dB
Unit dBµV/m
1MAX
IN1
1MA
P20
TDF
Start 3 GHz
400 MHz/
Stop 7 GHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
51.96 dBµV/m
18.00000000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 64 ms
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
1MA
P20
TDF
Start 7 GHz
1.1 GHz/
Stop 18 GHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
59.81 dBµV/m
2.48016000 GHz
RBW 1 MHz
VBW 10 Hz
SWT 500 s
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
IMA
P20
TDF
Start 1 GHz
200 MHz/
Stop 3 GHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
40.79 dBµV/m
4.96030000 GHz
RBW 1 MHz
VBW 10 Hz
SWT 1000 s
RF Att 0 dB
Unit dBµV/m
1VIEW
IN1
IMA
P20
TDF
Start 3 GHz
400 MHz/
Stop 7 GHz


Max/Ref Lvl
102 dB*
72 dB*
Marker 1 [T1]
50.64 dBµV/m
18.00000000 GHz
RBW 1 MHz
VBW 10 Hz
SWT 2800 s
RF Att 0 dB
Unit dBµV/m
1MAX
IN1
1MA
P20
TDF
Start 7 GHz
1.1 GHz/
Stop 18 GHz

Adjacent Restrict Band-edge (2310MHz~2410MHz and 2470MHz~2500MHz)

Test Results:

Test Conditions:

Ambient Temperature : 25 ℃/ 25 ℃ (Before Test/After Test);
Relative Humidity : 60 %/ 60 % (Before Test/After Test);
Power Supply : 120VAC/60Hz ;
Operating Mode of the EUT : Transmitting.

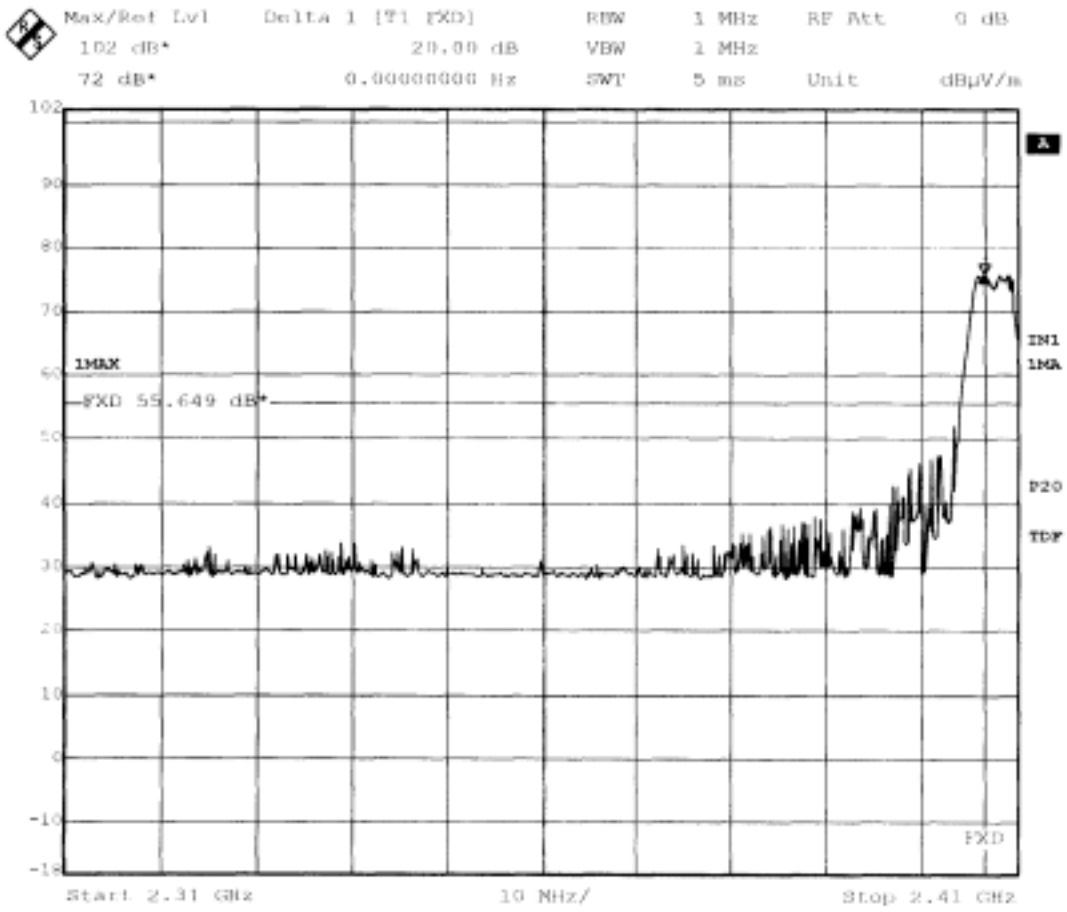
Radiated Emissions (PK detector)					
Description	Freq. (GHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Spurious emission	2.31~2.40	H/V	< 46.61	54.0	500
Spurious emission	2.4835~2.50	H/V	< 50.02	54.0	500

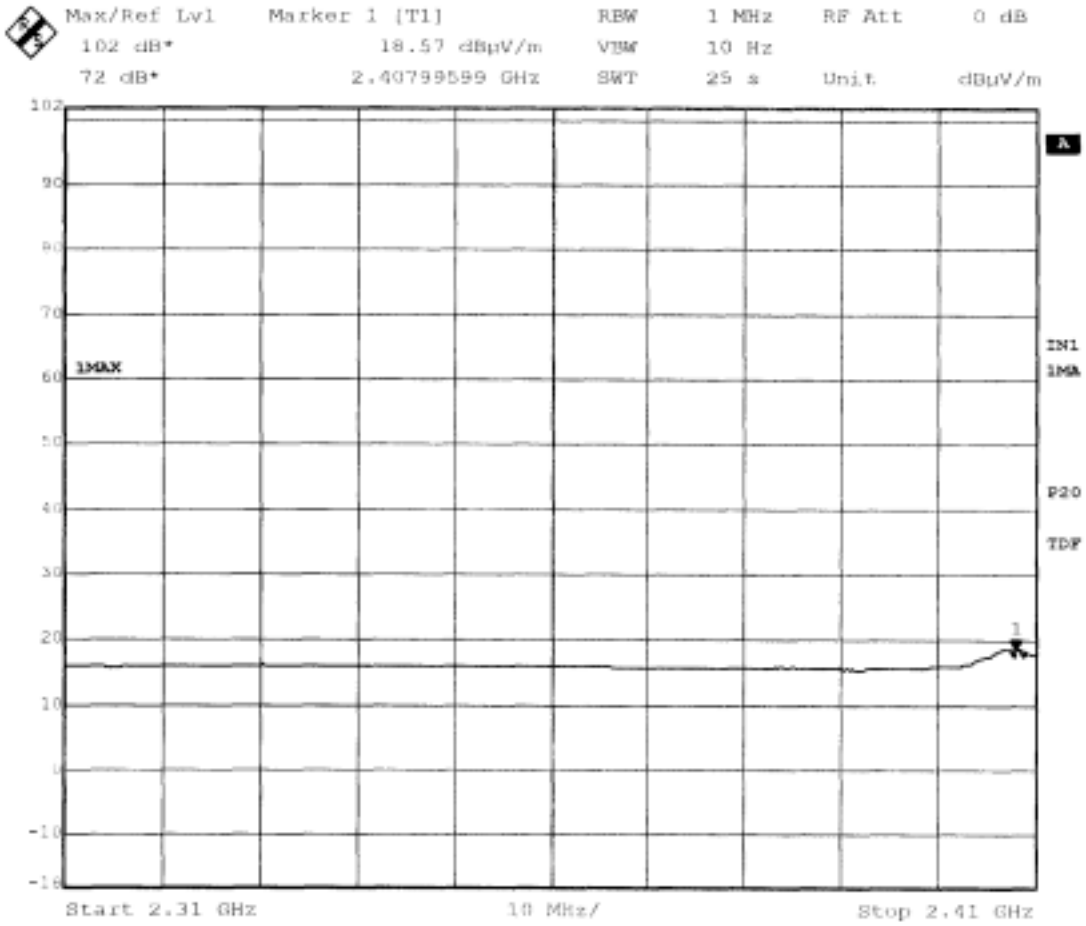
Radiated Emissions Peak level corrected by setting the VBW to 10 Hz					
Description	Freq. (MHz)	Antenna Polarity	Result dB(μV/m)	Limits dB (μV/m)	Limits (μV/m)
Spurious emission	2.31~2.40	H/V	< 20.00	54.0	500
Spurious emission	2.4835~2.50	H/V	< 20.00	54.0	500

Note: The peak levels are compliance with the 15.209 limits even though without adjusted by a “duty cycle correction factor”.

Scan Graph and Scan Settings

Transmitting (Horizontal, Vertical) (2310MHz~2410MHz)

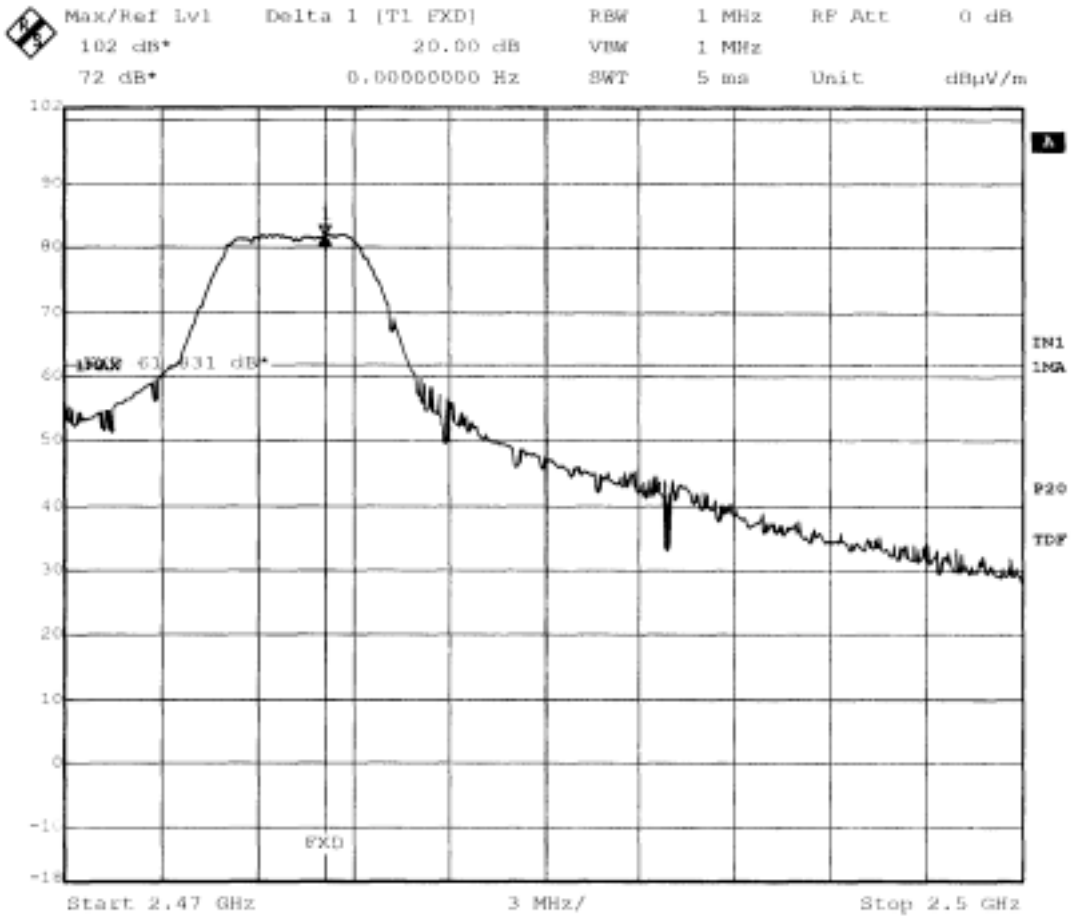


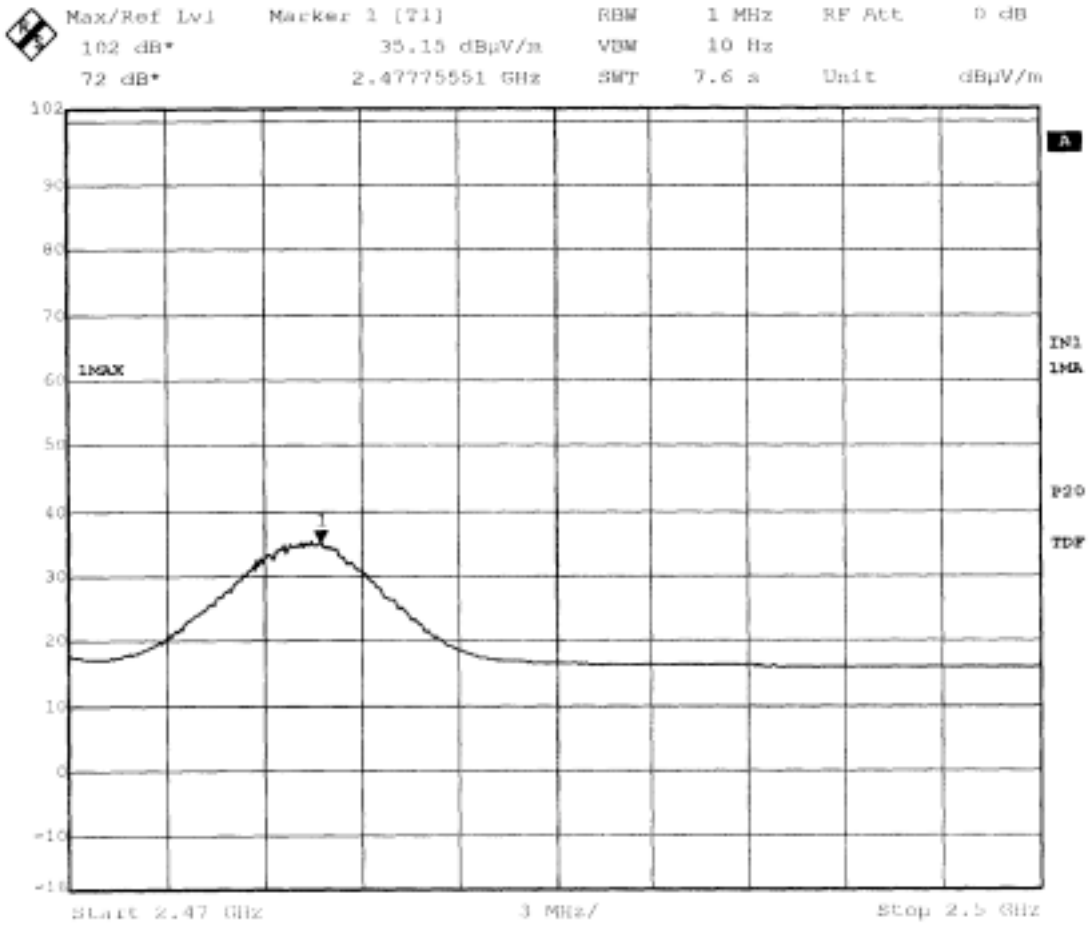


(Peak level corrected by setting the VBW to 10 Hz)

Scan Graph and Scan Settings

Transmitting (Horizontal, Vertical) (2470MHz~2500MHz)





(Peak level corrected by setting the VBW to 10 Hz)

5. Photographs & Nameplates of the EUT

5.1 Outlook:

Front View of the Transmitter

Rear View of the Transmitter

Side View of the Transmitter

Front View of the AC/DC Adaptor

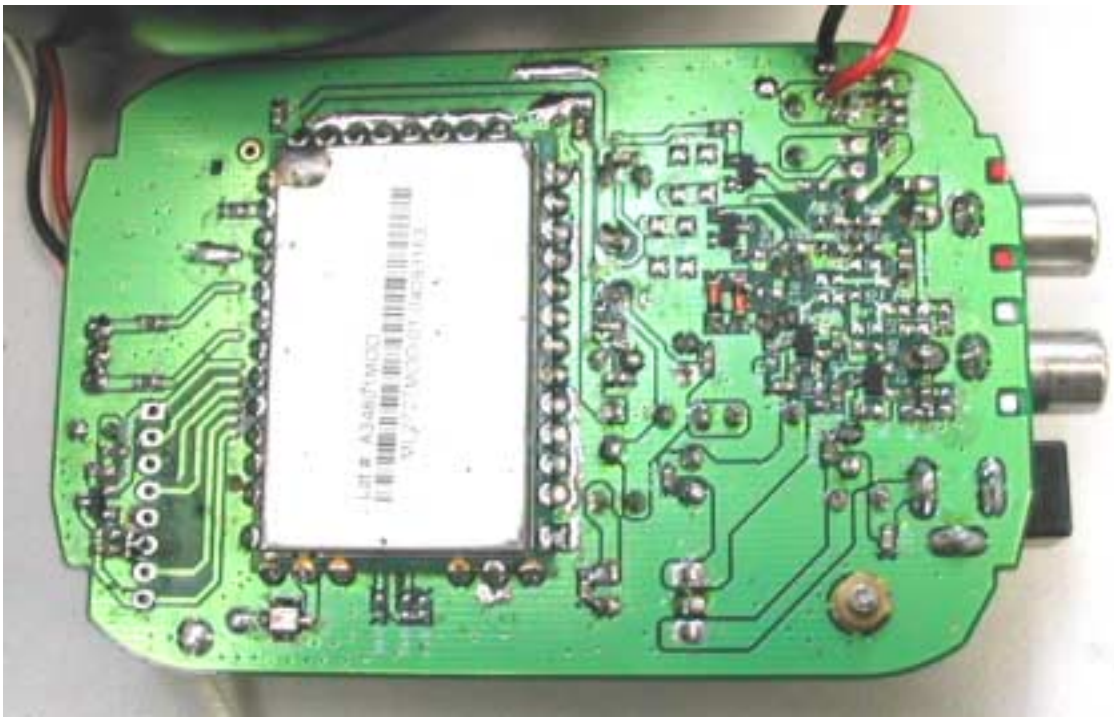
Rear View of the AC/DC Adaptor

5.2 Structure of internal wires:

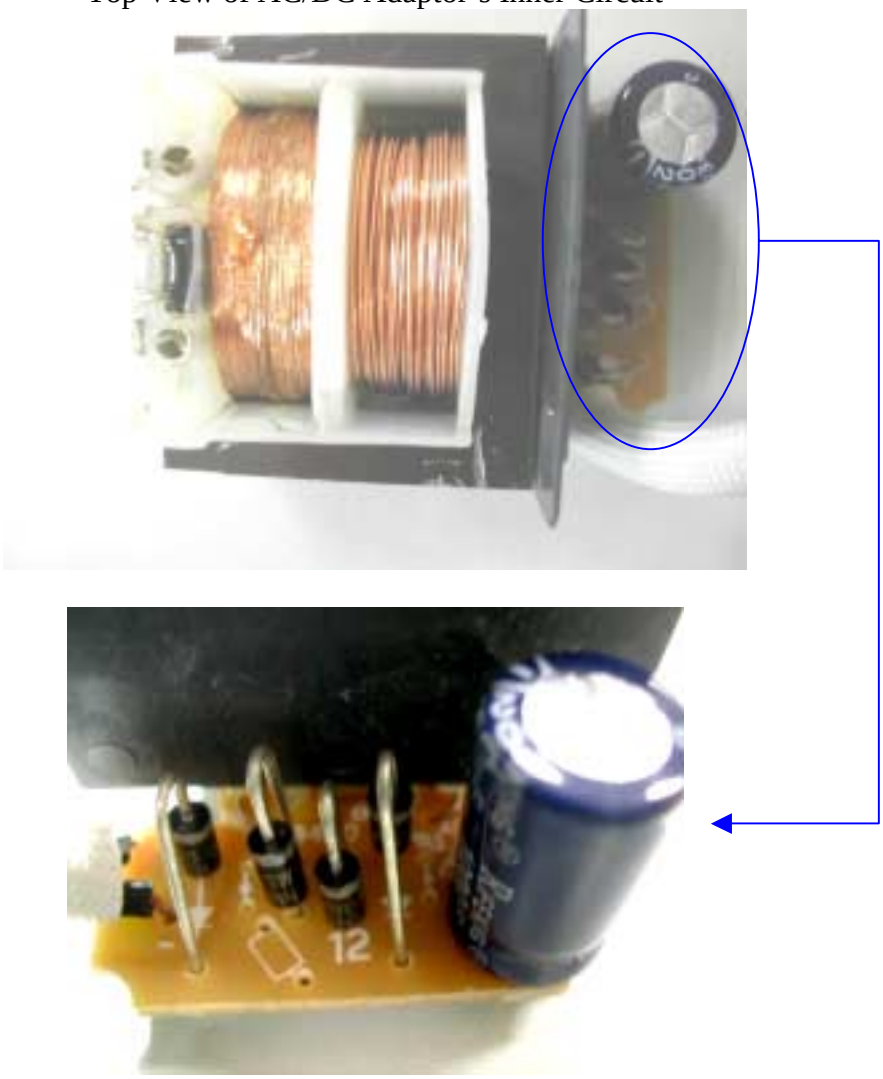
Internal Structure of the Transmitter

Top View of the Transmitter's Inner Circuit

Bottom View of the Transmitter's Inner Circuit



Top View of AC/DC Adaptor's Inner Circuit



Bottom View of AC/DC Adaptor's Inner Circuit

5.3 Nameplate:

56mm

This Device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING:

Modification of this device to receive cellular radio-telephone service signals is prohibited under FCC rules and Federal Law.

FCC ID: REDHP991 -001T

28mm

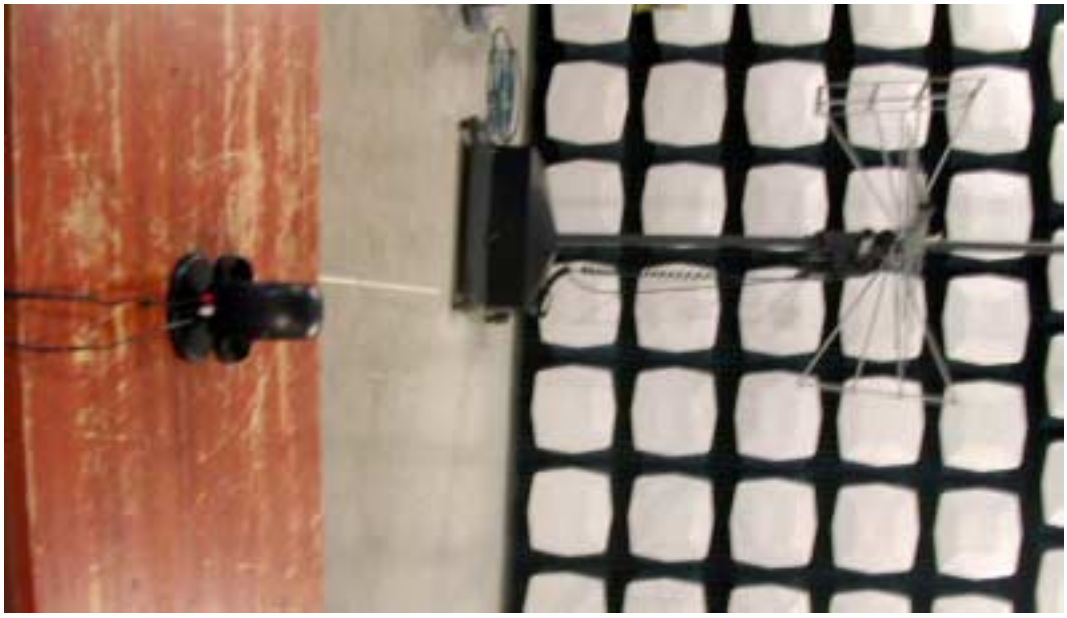
FCC label location

6. Photograph of the test setup

Conducted Emission

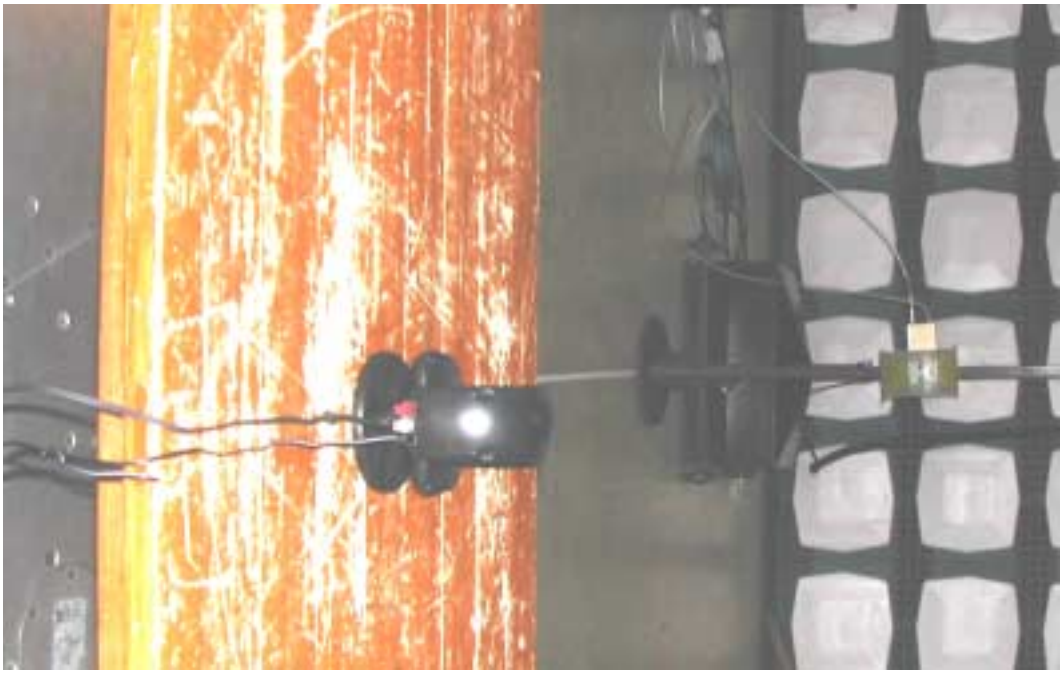
Measurement of and Radiated Emission

Spurious Emission
(Front view)

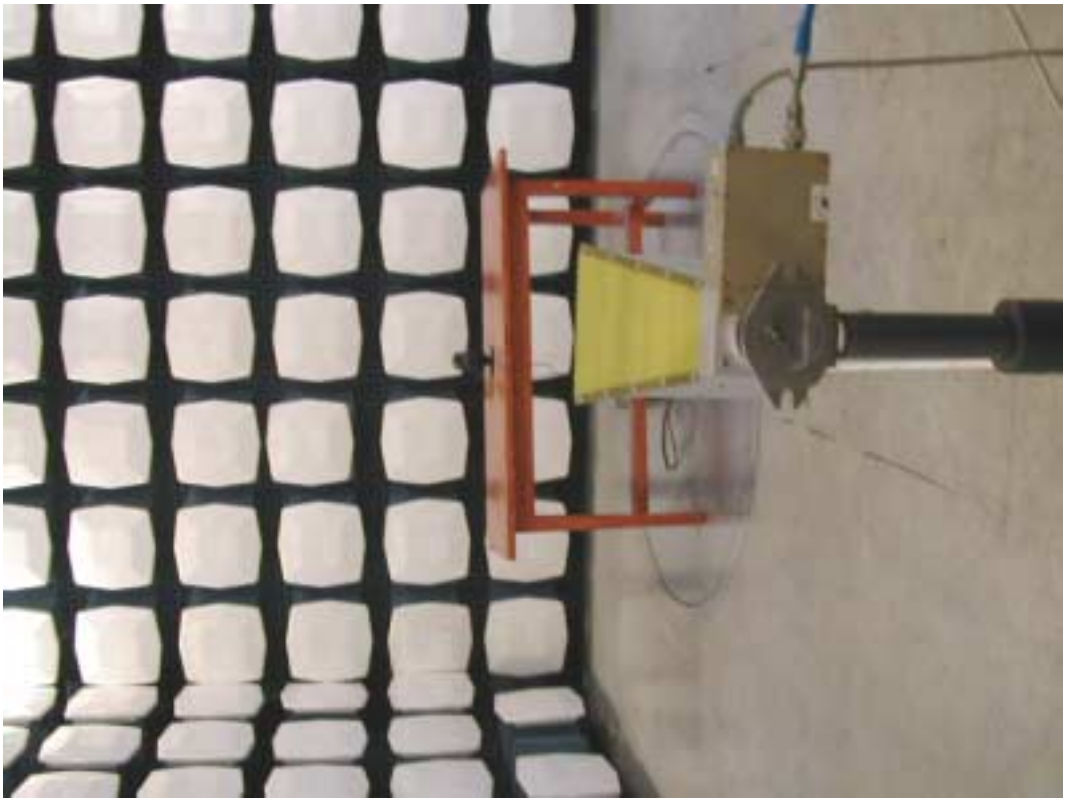


Spurious Emission
(Back view)

Spurious Emission and other Items
(Front view)



(Back view)



Appendix A

Test Equipment	Mature Date of Calibration	Type/Model	Serial No.	Manufacturer
EMI Test Receiver	2005.10.12	ESI26	834000/009	R & S
LISN	2005.10.12	ESH3-Z5	844982/020	R & S
LISN	2005.10.12	ESH3-Z5	833874/002	R & S
LISN	2005.10.12	ESH2-Z5	833332/008	R & S
Biconilog Antenna	2005.06.04	3141	1178	EMCO
Waveguide Horn	2005.06.04	3115	0002-6038	EMCO
Double-Ridged Waveguide Horn	2005.06.04	3116	----	EMCO

End of Document