



FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

Philips Consumer Lifestyle

InRange

Model No:AEA1000x/17;AEA1000x/37("x" can be A-W or
black, denoted the different canbinet colour.)

Test Model: AEA1000/37

FCC ID: BOUAEA1000

Prepared for : Philips Consumer Lifestyle
1600 Summer Street Stamford, CT 06912 United States

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Report Number : ACS-F12148
Date of Test : Jul.05~14, 2012
Date of Report : Aug.01, 2012

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TEST REPORT CERTIFICATION

Applicant : Philips Consumer Lifestyle
Manufacturer : Keen High Technologies Ltd.
EUT Description : InRange
FCC ID : BOUAEA1000

(A) Model No : AEA1000x/17;AEA1000x/37("x"can be A-W
or black, denoted the different canbinet
colour.)

(B) Test Model : AEA1000/37

(C) Power Supply : DC 3V

(D) Test Voltage : DC 3V

Tested for comply with:
FCC Rules and Regulations Part 15 Subpart C:2008
Test procedure used:
ANSI C63.10:2009

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm
comply with all the FCC Part 15 Subpart C requirements.

The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.
is assumed full responsibility for the accuracy and completeness of these tests. This report contains data
that are not covered by the NVLAP accreditation. Also, this report shows that the Equipment Under Test
(EUT) is to be technically compliant with the FCC requirements.

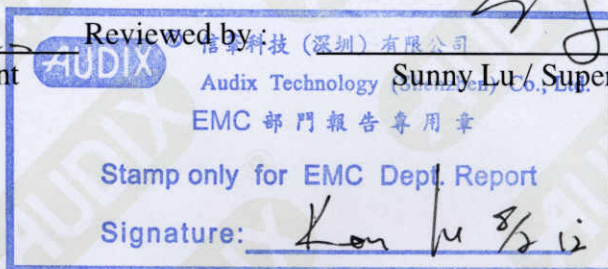
This Report is made under FCC Part 2.1075. No modifications were required during testing to bring this
product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without
written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

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.

Date of Test : Jul.05~ 14, 2012 Report of date: Aug.01, 2012

Prepared by : Selina Liu Reviewed by : Sunny Lu
Selina Liu/ Assistant Auditor Sunny Lu/ Supervisor



Approved & Authorized Signer : Ken Lu
Ken Lu / Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	Standard	Results
Power Line Conducted Emission	FCC Part 15: 15.207 ANSI C63.10: 2009	PASS
Radiated Emission	FCC Part 15: 15.209 ANSI C63.10: 2009	PASS
Band Edge Compliance	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
Conducted spurious emissions	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
6dB Bandwidth	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
Peak Output Power	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
Power Spectral Density	FCC Part 15: 15.247 ANSI C63.10: 2009	PASS
Antenna requirement	FCC Part 15: 15.203	PASS

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Product Name	: InRange
Model Number	: AEA1000x/17;AEA1000x/37("x"can be A-W or black, denoted the different canbinet colour.)
Test model	AEA1000/37
FCC ID	: BOUAEA1000
Operation Frequency	: 2402-2480MHz
Channel Number	: 40
Modulation Technology	: GFSK
Antenna Assembly Gain	: PCB antenna, 0dBi
Applicant	: Philips Consumer Lifestyle 1600 Summer Street Stamford, CT 06912 United States
Manufacturer	: Keen High Technologies Ltd. Block A1&A2,Ze Da Li Industrial Park, Tangwei Area, Fuyong, Bao'an, 518103 Shenzhen,Guangdong Province,China
Date of Test	: Jul.05~14, 2012
Date of Receipt	: Jun.25 , 2012
Sample Type	: Prototype production

2.2.Test Information

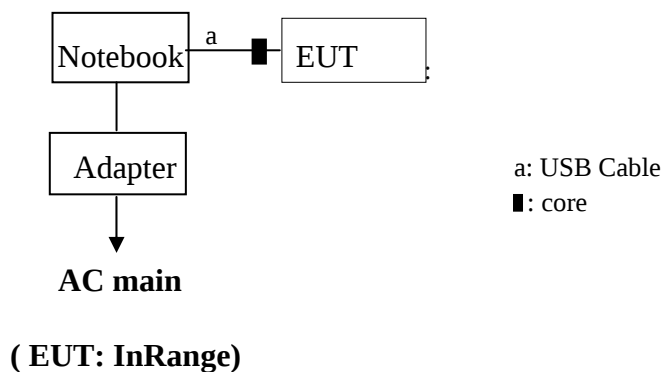
A special test software was used to control EUT work in Continuous TX mode(100% duty cycle), and select test channel, wireless mode and data rate.

Mode	Channel	Frequency (MHz)
GFSK	Low :CH0	2402
	Middle: CH19	2440
	High: CH39	2480

2.3.Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number	Approved type
1.	Notebook	---	DELL	PP09S	N/A	☒ FCC DoC ☒ BSMI ID: R41108
		Power Cord: Unshielded, Detachable, 1.8m Power Adapter: Manufacturer: DELL, M/N: LA65NS1-00 Cable: Unshielded, Detachable, 4.0m(Bond one ferrite core)				

2.4.Block Diagram of Test Setup



2.5. Test Facility

Site Description

Name of Firm : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block, Shenzhen
Science & Industrial Park, Nantou,
Shenzhen, Guangdong, China

3m Anechoic Chamber : Certificated by FCC, USA
Registration Number: 90454
Valid Date: Feb.22, 2015

3m & 10m Anechoic Chamber : Certificated by FCC, USA
Registration Number: 794232
Valid Date: Dec.30, 2012

EMC Lab. : Certificated by Industry Canada
Registration Number: IC 5183A-1
Valid Date: Jun.13, 2014

: Certificated by DAkkS, Germany
Registration No: D-PL-12151-01-01
Valid Date: Feb.01, 2014

Accredited by NVLAP, USA
NVLAP Code: 200372-0
Valid Date: Mar.31, 2013

2.6. Measurement Uncertainty (95% confidence levels, k=2)

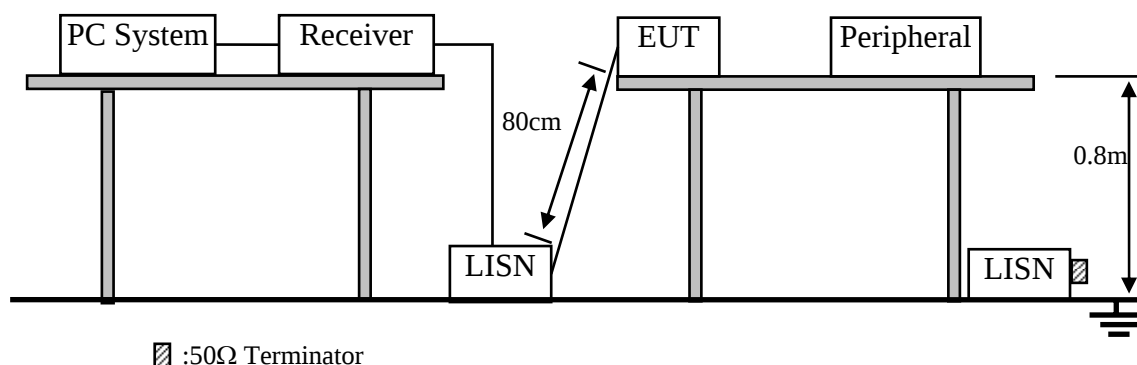
Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	3.2 dB (150KHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	3.6 dB(30~200MHz, Polarize: H)
	3.8 dB(30~200MHz, Polarize: V)
	4.2 dB(200M~1GHz, Polarize: H)
	3.8 dB(200M~1GHz, Polarize: V)
Uncertainty for Radiation Emission test in 3m chamber (1GHz-18GHz)	3.1dB (Distance: 3m Polarize: V)
	3.7 dB (Distance: 3m Polarize: H)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.57 dB
Uncertainty for Conduction Spurious emission test	2.00 dB
Uncertainty for Output power test	0.73 dB
Uncertainty for Power density test	2.00 dB
Uncertainty for Frequency range test	7×10^{-8}
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.038 %
Uncertainty for test site temperature and humidity	0.6°C
	3%

3. POWER LINE CONDUCTED EMISSION TEST

3.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS10	838693/001	Oct.31, 11	1 Year
2.	L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	834066/011	Oct.31, 11	1 Year
3.	L.I.S.N.#3	Kyoritsu	KNW-242C	8-1920-1	May.08, 12	1 Year
4.	Terminator	Hubersuhner	50Ω	No. 1	May.08, 12	1 Year
5.	Terminator	Hubersuhner	50Ω	No. 2	May.08, 12	1 Year
6.	RF Cable	Fujikura	3D-2W	No.1	May.08, 12	1Year
7.	Coaxial Switch	Anritsu	MP59B	M50564	May.08, 12	1 Year
8.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100341	May.08, 12	1 Year

3.2. Block Diagram of Test Setup



3.3. Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

3.4. Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.1. InRange (EUT)

Model Number : AEA1000/37

Serial Number : N/A

3.4.2. Support Equipment: As Tested Supporting System Details, in Section 2.2.

3.5. Operating Condition of EUT

3.5.1. Setup the EUT and simulator as shown as Section 3.2.

3.5.2. Turned on the power of all equipment.

3.5.3. PC run test software to control EUT work in Tx mode.

3.6. Test Procedure

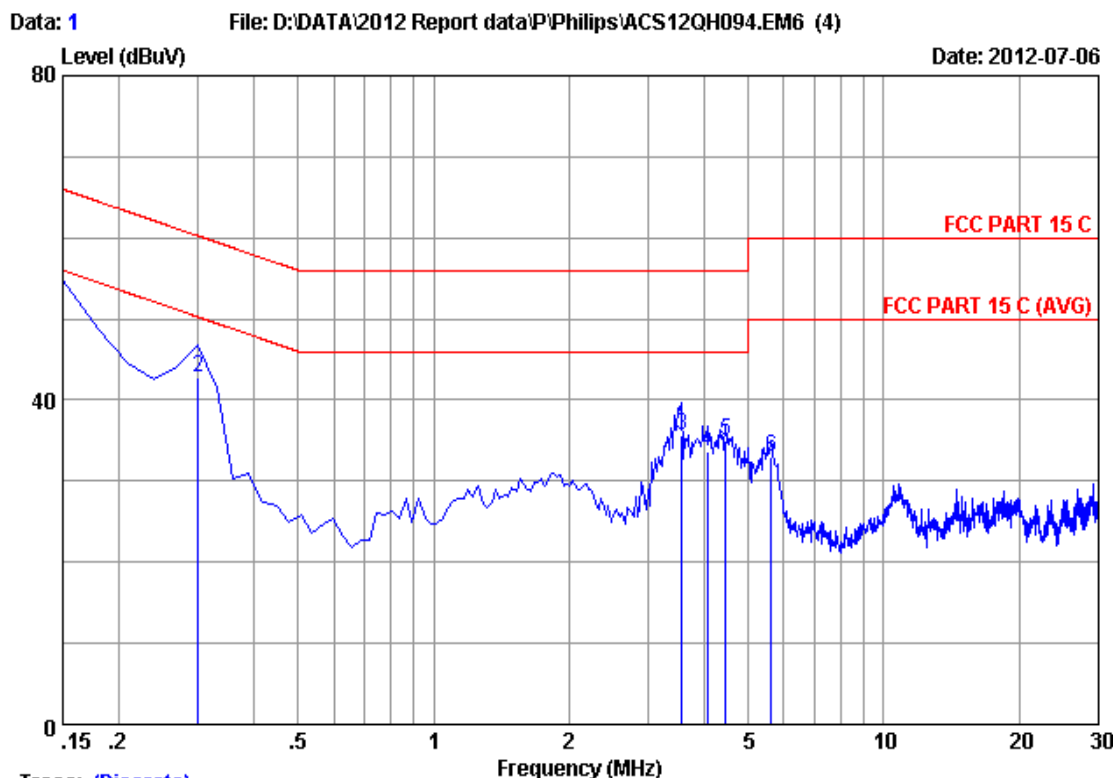
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs). The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2009 on Conducted Emission Test.

The bandwidth of test receiver (R & S ESHS10) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.7. Power Line Conducted Emission Test Results

PASS. (All emissions not reported below are too low against the prescribed limits.)

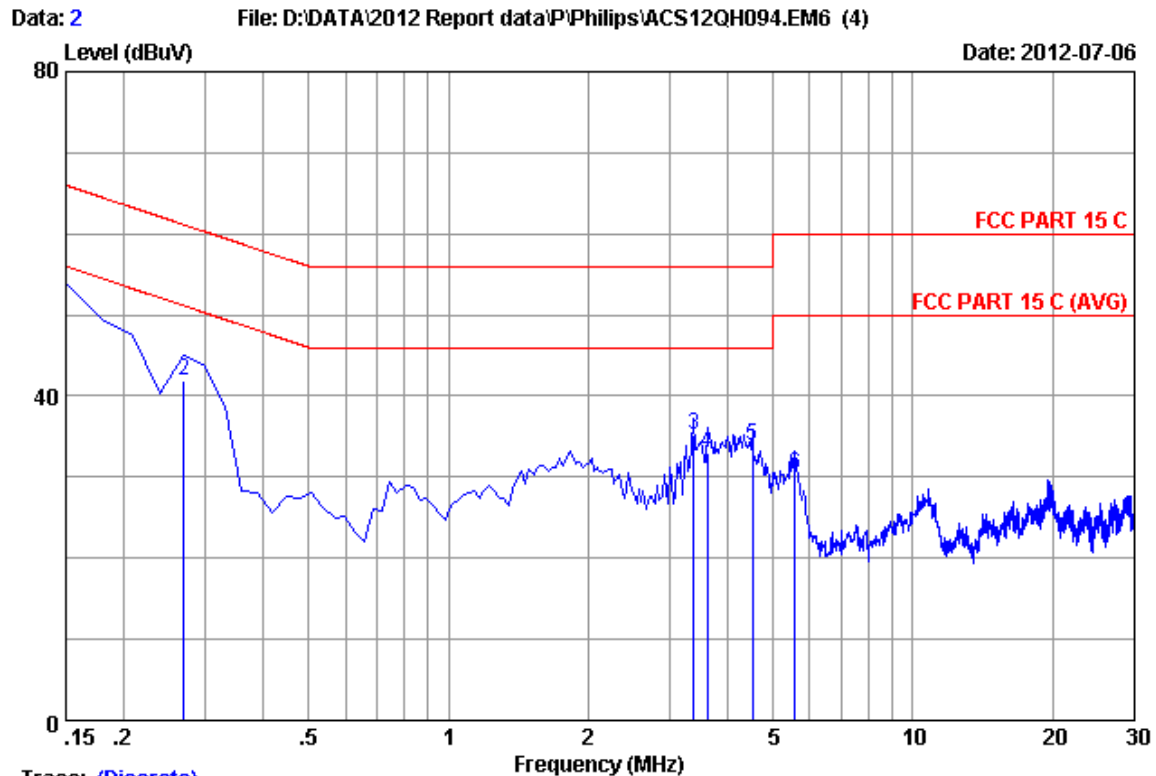


Trace: (Discrete)

Site no :1#conduction Data No :1
 Dis./Ant. :** 2012 ESH2-Z5 LINE
 Limit :FCC PART 15 C
 Env./Ins. :25.7°C/60% Engineer :Leo-Li
 EUT :InRange M/N:AEA1000/37
 Power Rating :DC 5V From PC Input AC 120V/60Hz
 Test Mode :Tx Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.17	9.94	35.60	45.71	66.00	20.29	QP
2	0.29925	0.15	9.95	32.70	42.80	60.26	17.46	QP
3	3.553	0.23	9.94	25.52	35.69	56.00	20.31	QP
4	4.060	0.24	9.94	23.55	33.73	56.00	22.27	QP
5	4.448	0.24	9.95	24.71	34.90	56.00	21.10	QP
6	5.613	0.27	9.95	22.66	32.88	60.00	27.12	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)+Reading.
 2.If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



Trace: (Discrete)

Site no :1#conduction Data No :2
 Dis./Ant. :** 2012 ESH2-Z5 NEUTRAL
 Limit :FCC PART 15 C
 Env./Ins. :25.7°C/60% Engineer :Leo-Li
 EUT :InRange M/N:AEA1000/37
 Power Rating :DC 5V From PC Input AC 120V/60Hz
 Test Mode :Tx Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.14	9.94	33.94	44.02	66.00	21.98	QP
2	0.26940	0.14	9.95	31.85	41.94	61.14	19.20	QP
3	3.374	0.23	9.94	24.99	35.16	56.00	20.84	QP
4	3.613	0.23	9.94	22.90	33.07	56.00	22.93	QP
5	4.508	0.24	9.95	23.76	33.95	56.00	22.05	QP
6	5.583	0.26	9.95	20.02	30.23	60.00	29.77	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)
 +Reading.
 2.If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

4. RADIATED EMISSION TEST

4.1. Test Equipment

4.1.1. For frequency range 30MHz~1000MHz (At Anechoic Chamber)

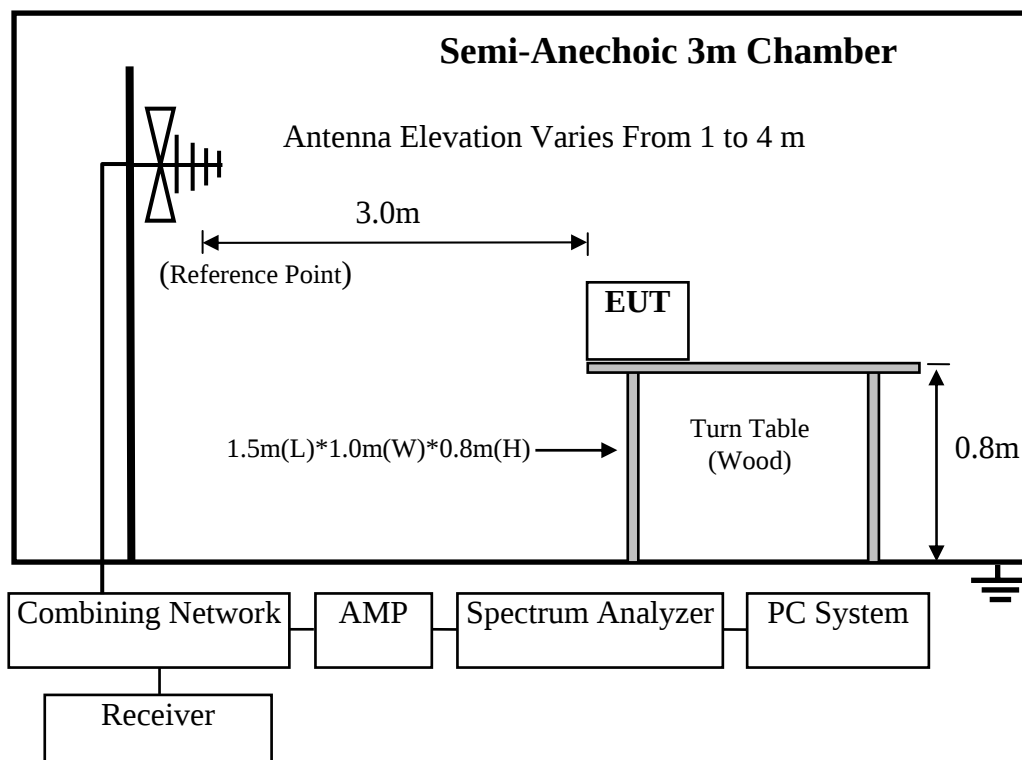
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	3#Chamber	AUDIX	N/A	N/A	Nov.28,11	1 Year
2	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 12	1 Year
3	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 12	1 Year
4	Amplifier	HP	8447D	2648A04738	May.08, 12	1 Year
5	Bilog Antenna	Schaffner	CBL6111C	2598	Oct.26, 10	2.0 Year
6	RF Cable	MIYAZAKI	CFD400-NL	3# Chamber No.1	May.08, 12	0.5Year
7	Coaxial Switch	Anritsu	MP59B	M74389	May.08, 12	1 Year

4.1.2. For frequency range 1GHz~6GHz (At Anechoic Chamber)

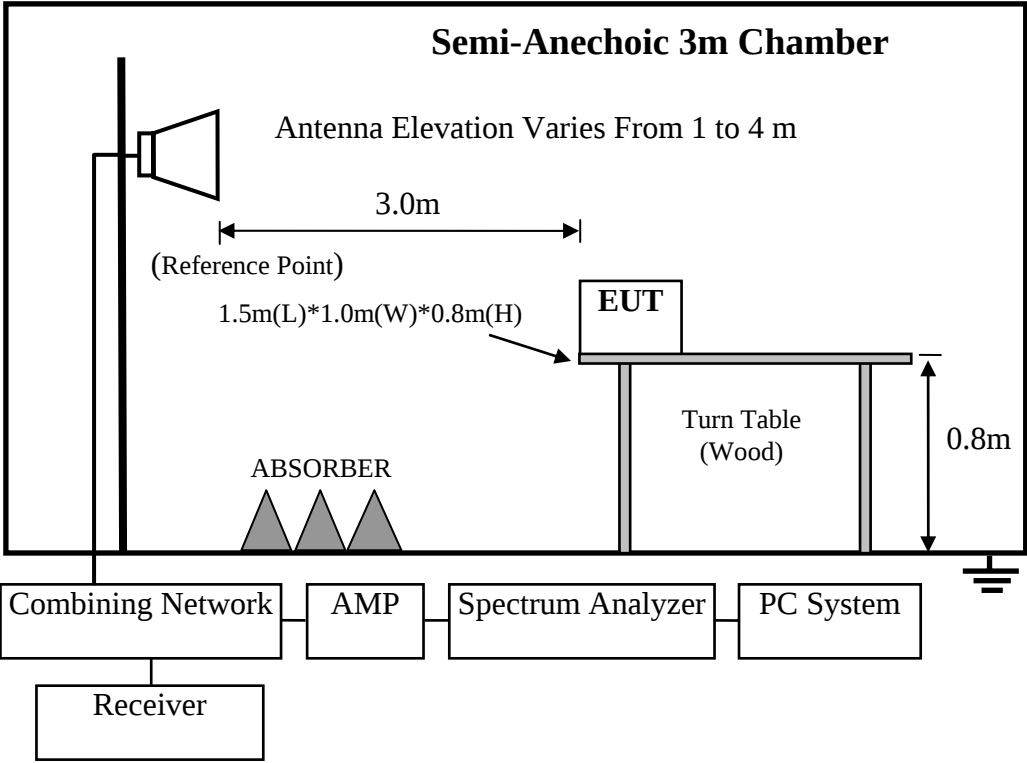
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4407B	MY41440292	May.08, 12	1 Year
2	Horn Antenna	EMCO	3115	9510-4580	Nov.19, 11	1 Year
3	Horn Antenna	EMCO	3116	00060089	Nov.25, 11	1.5 Year
4	Amplifier	Agilent	8449B	3008A00863	May.08, 12	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX106	77980/6	May.08, 12	0.5Year
6	RF Cable	Hubersuhner	SUCOFLEX106	77977/6	May.08, 12	0.5Year

4.2. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range 1GHz-25GHz



4.3.Radiated Emission Limit

4.3.1. 15.209 limits

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

- Remark :
- (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$
 - (2) The smaller limit shall apply at the cross point between two frequency bands.
 - (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

4.3.2.15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

4.4.EUT Configuration on Test

The configurations of EUT are listed in Section 3.5.

4.5.Operating Condition of EUT

Same as Conducted Emission test that is listed in Section 3.6. except the test set up replaced by Section 4.2.

4.6.Test Procedure

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

4.7. Radiated Emission Test Results

PASS.

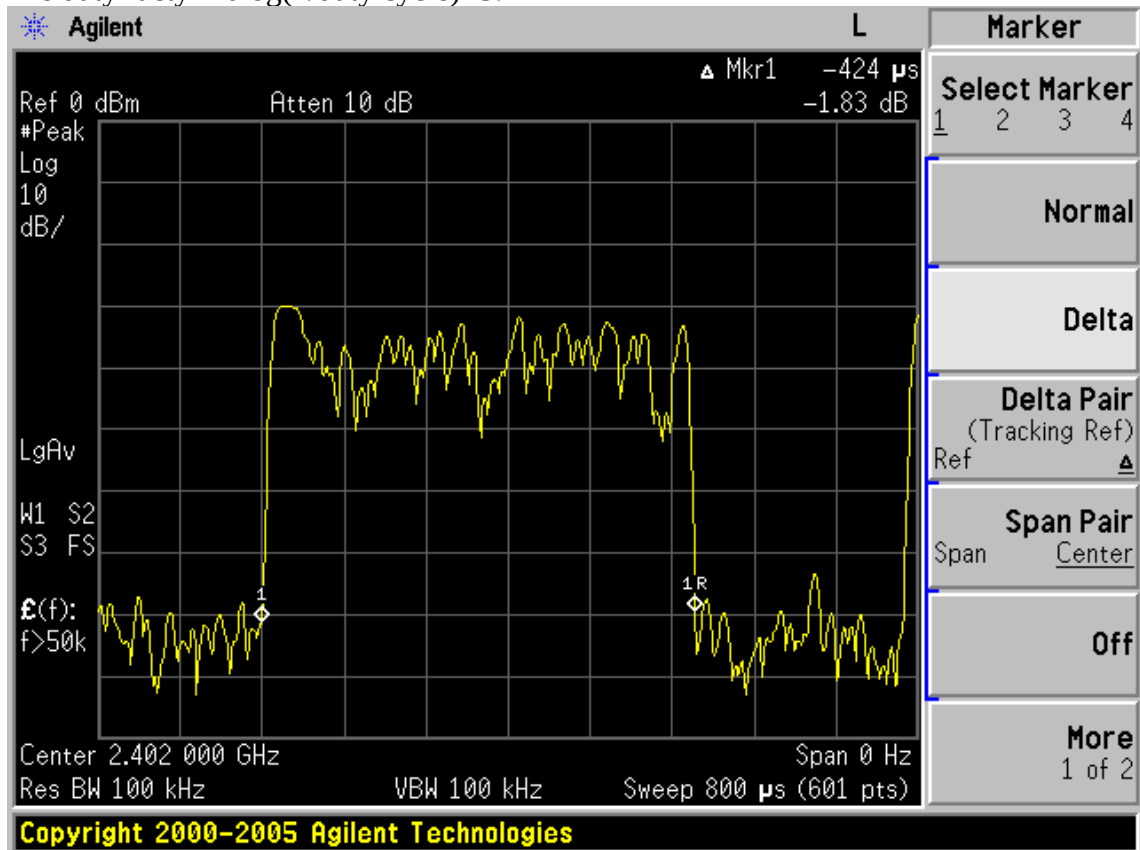
All the emissions from 30MHz to 25 GHz were comply with 15.209 limits.

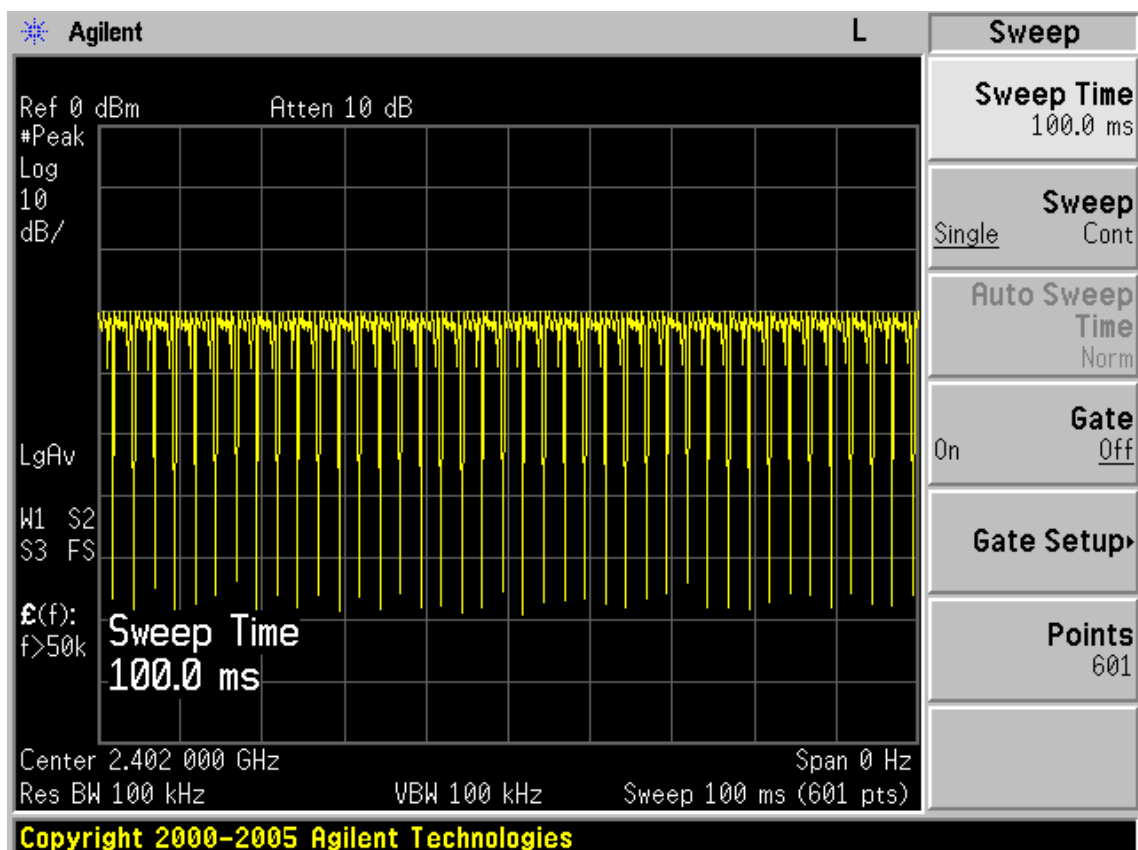
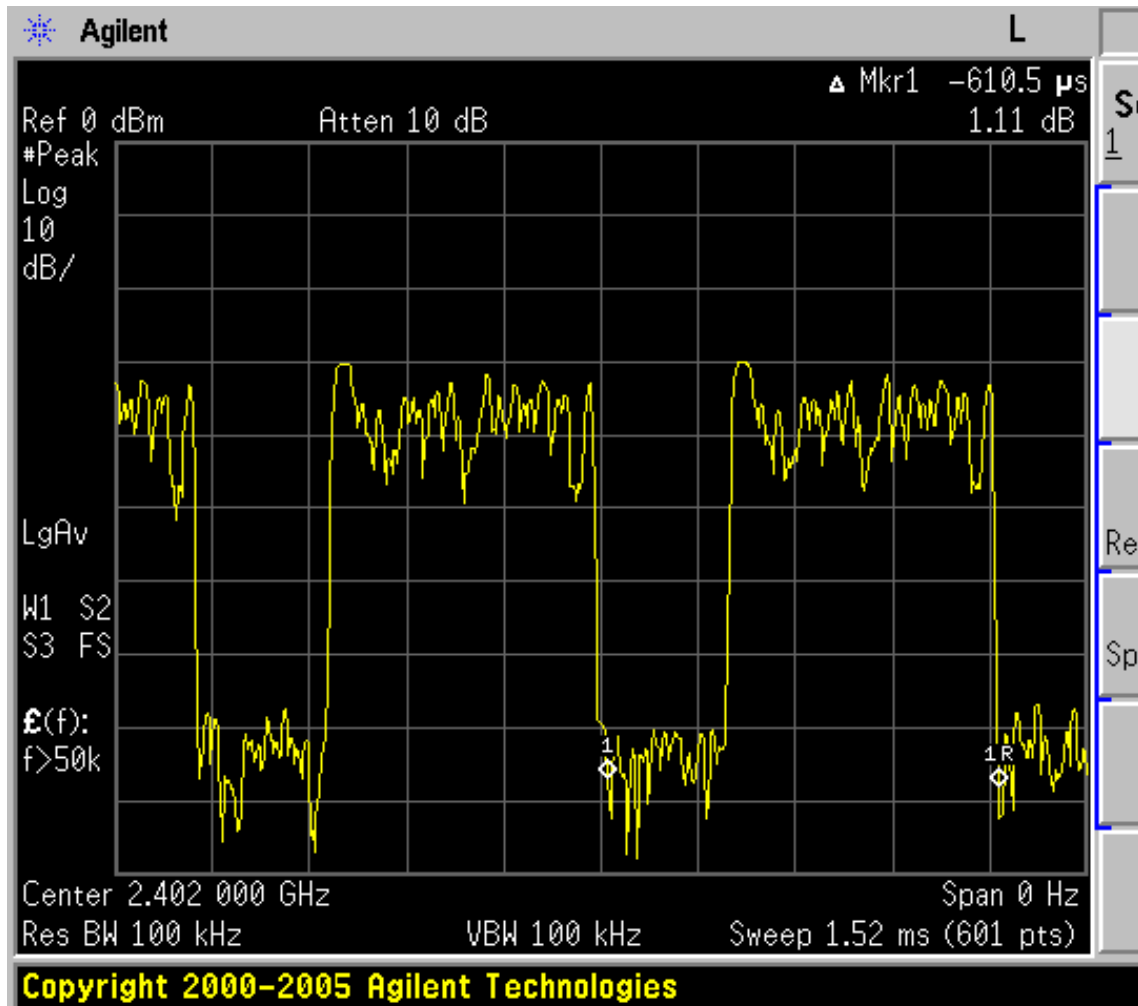
For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

Note: The duty cycle factor for calculate average level is 3.17dB, and average limit is 20dB below peak limit, so if peak measured level comply with peak limit, the average level was deemed to comply with average limit.

The duty cycle= $424/610.5 \times 100\% = 69.45\%$

The duty facty= $10\log(1/\text{duty cycle}) = 3.17$



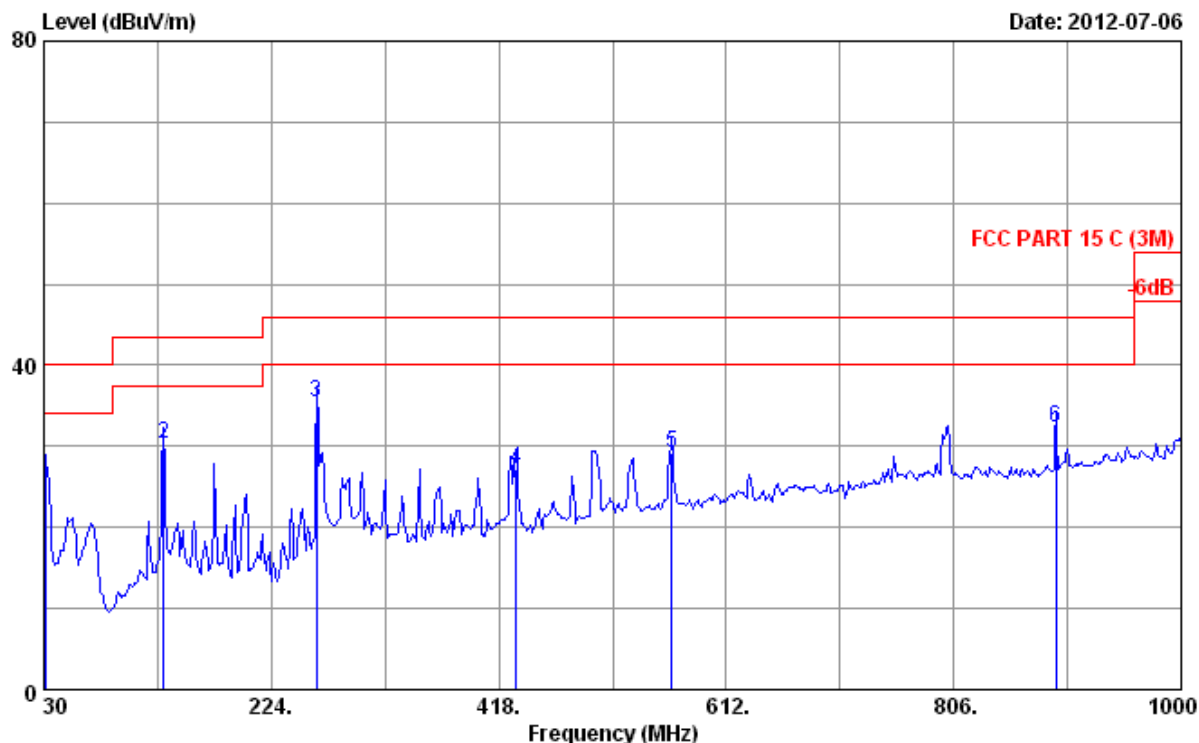


Frequency: 30MHz~1GHz

Data: 2

File: E:\2012 Report Data\Philips\ACS120H094.EM6 (4)

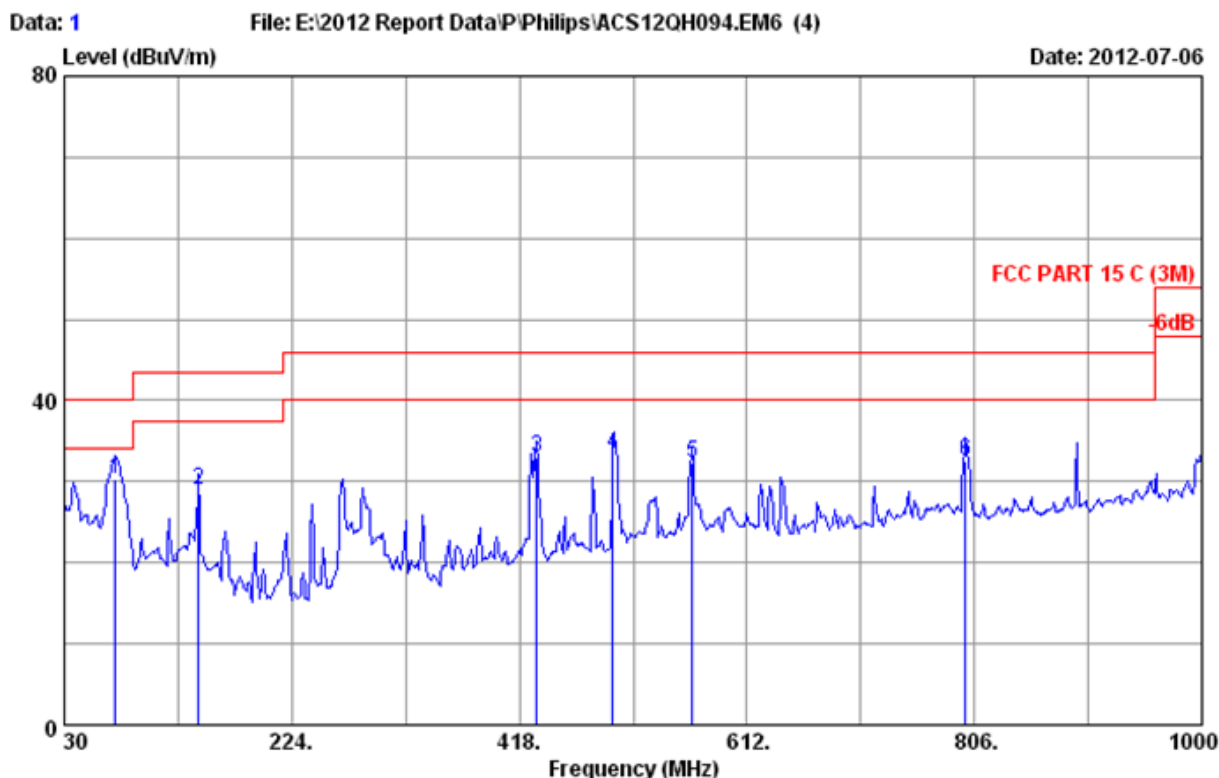
Date: 2012-07-06



Site no. : 3m Chamber Data no. : 2
 Dis. / Ant. : 3m 2012 CBL6111C 2598 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 24°C/56% Engineer : Leo-Li
 EUT : InRange M/N: AEA1000/37
 Power rating : DC 5V From PC Input AC 120V/60Hz
 Test Mode : Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	31.940	17.61	0.45	8.17	26.23	40.00	13.77	QP
2	131.850	11.36	0.91	17.94	30.21	43.50	13.29	QP
3	262.800	13.91	1.19	20.39	35.49	46.00	10.51	QP
4	432.550	17.58	1.64	8.01	27.23	46.00	18.77	QP
5	565.440	19.91	2.01	7.20	29.12	46.00	16.88	QP
6	893.300	23.46	2.80	6.08	32.34	46.00	13.66	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 1
 Dis. / Ant. : 3m 2012 CBL6111C 2598 Ant. pol. : VERTICAL
 Limit : FCC PART 15 C (3M)
 Env. / Ins. : 24°C/56% Engineer : Leo-Li
 EUT : InRange M/N:AEA1000/37
 Power rating : DC 5V From PC Input AC 120V/60Hz
 Test Mode : Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	73.650	6.40	0.72	23.09	30.21	40.00	9.79	QP
2	144.460	11.17	0.94	16.81	28.92	43.50	14.58	QP
3	432.550	17.58	1.64	13.66	32.88	46.00	13.12	QP
4	497.540	18.89	1.83	12.81	33.53	46.00	12.47	QP
5	565.440	19.91	2.01	10.30	32.22	46.00	13.78	QP
6	798.240	22.75	2.70	7.01	32.46	46.00	13.54	QP

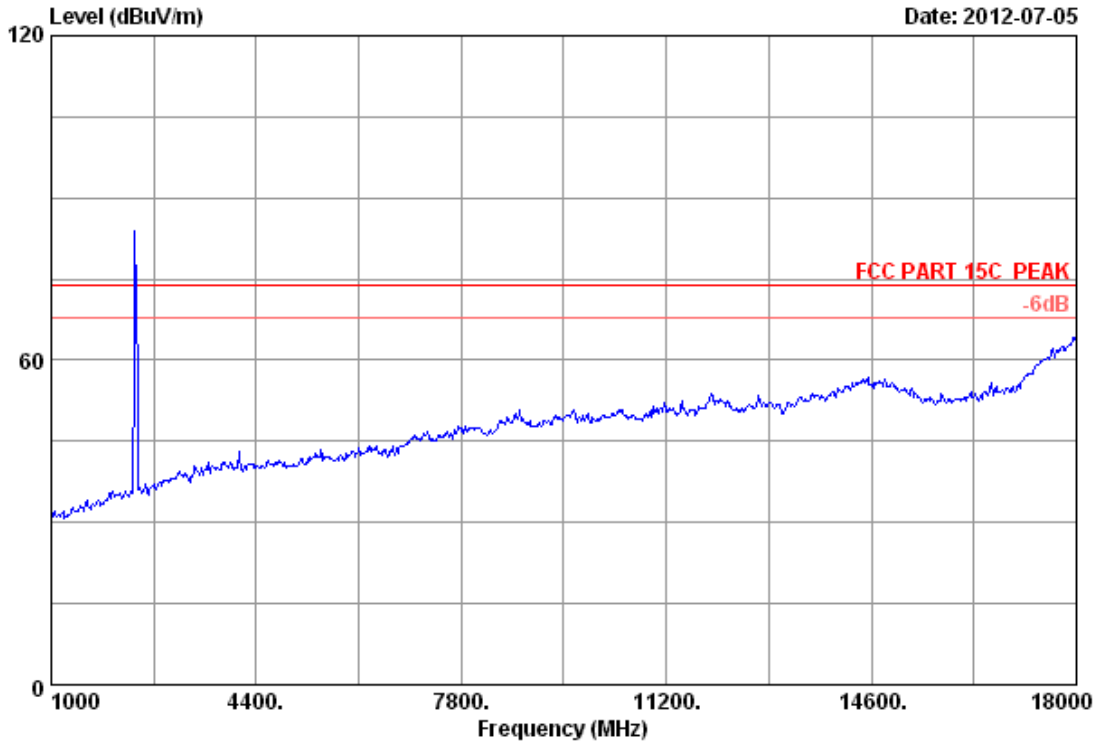
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Frequency: 1GHz~18GHz

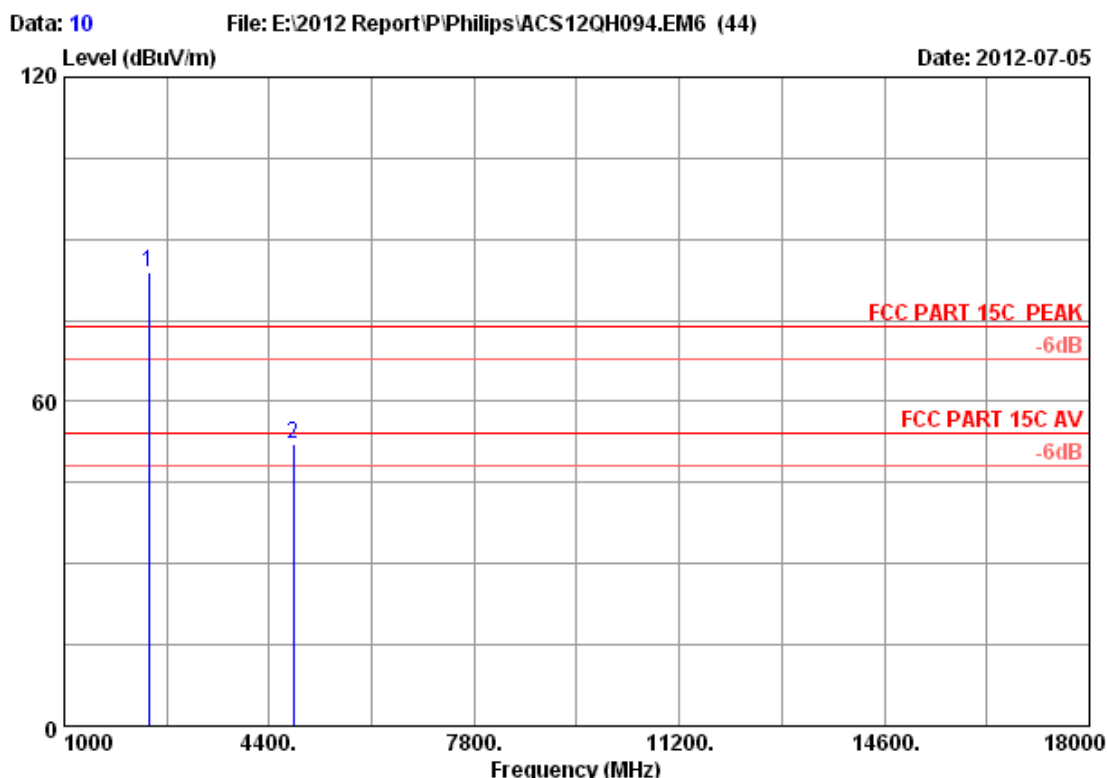
Data: 9

File: E:\2012 Report\Philips\ACS12QH094.EM6 (44)

Date: 2012-07-05



Site no.	: 3m Chamber	Data no.	: 9
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2402MHz Tx		
M/N	: AEA1000/37		

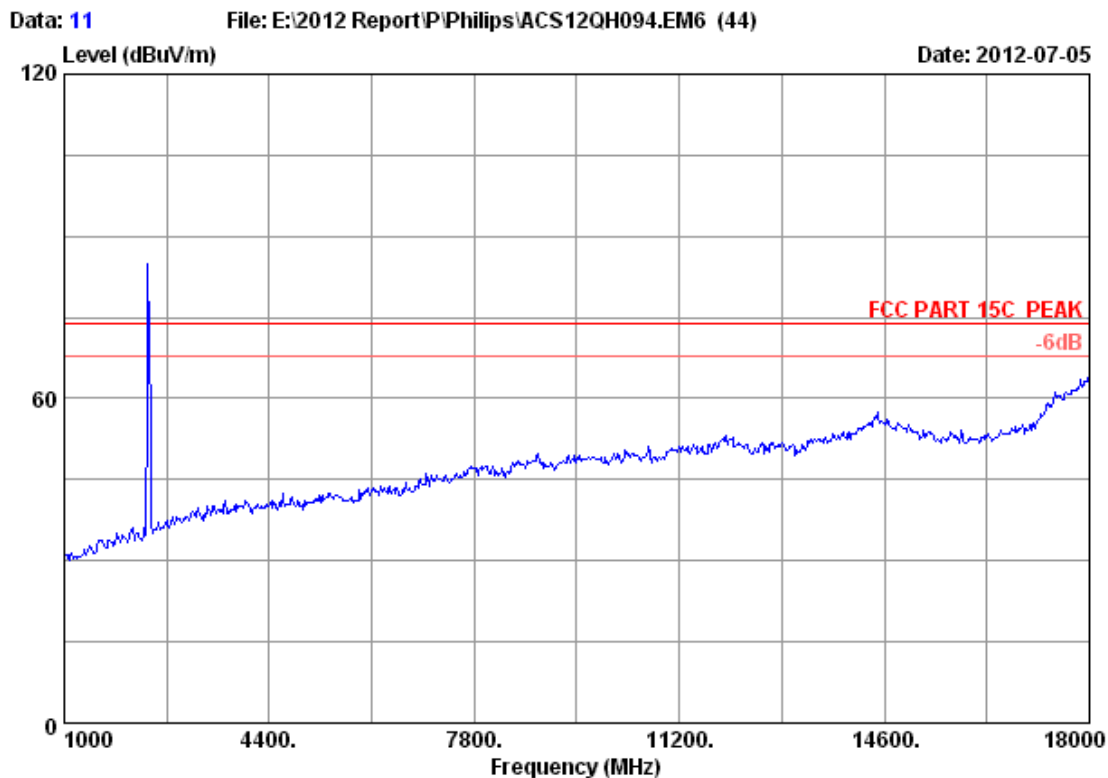


Site no. : 3m Chamber Data no. : 10
Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : InRange
Power supply : DC 3V
Test mode : 2402MHz Tx
M/N : AEA1000/37

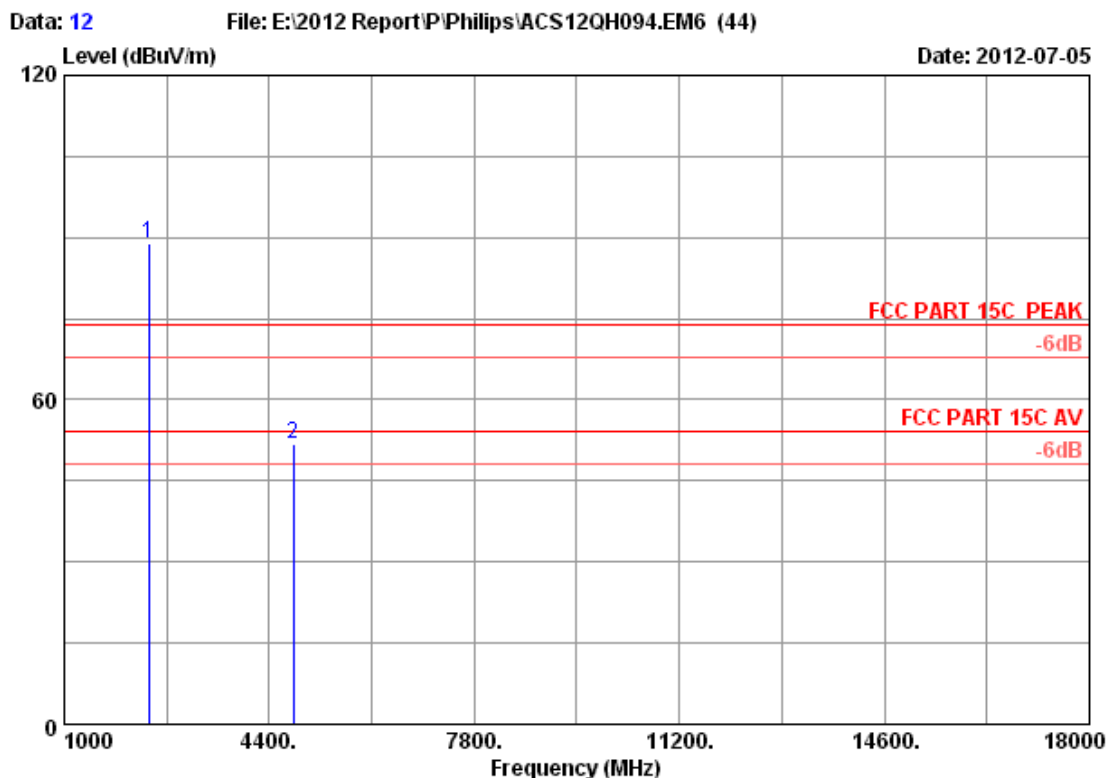
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.000	27.96	6.01	34.44	84.53	84.06	74.00	-10.06	Peak
2	4804.000	32.86	8.52	34.60	45.33	52.11	74.00	21.89	Peak

Remarks:

- Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
- The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 11
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2402MHz Tx		
M/N	: AEA1000/37		

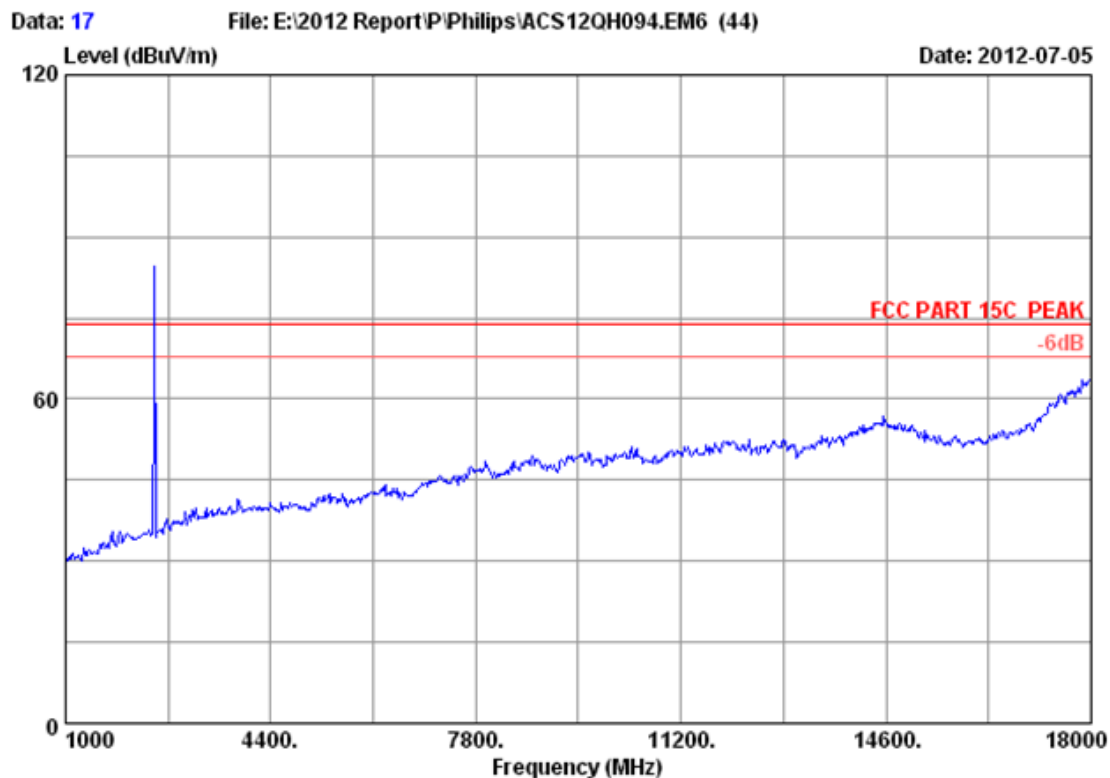


Site no.	: 3m Chamber	Data no.	: 12
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2402MHz Tx		
M/N	: AEA1000/37		

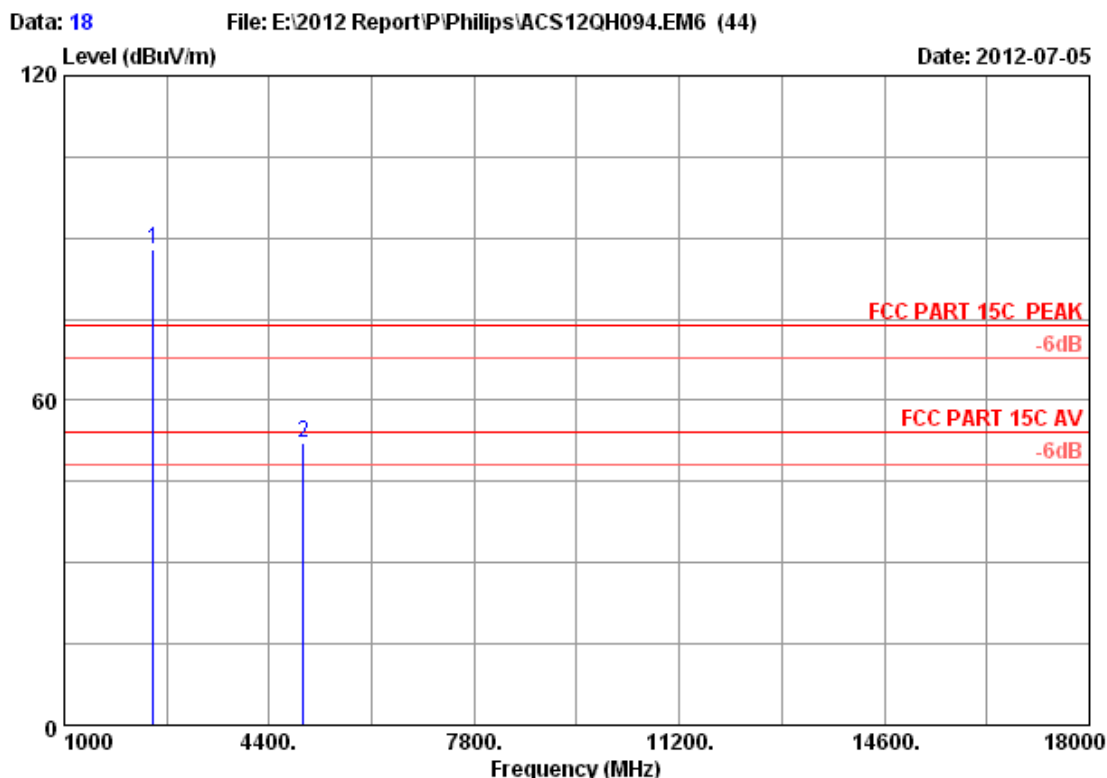
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.000	27.96	6.01	34.44	89.22	88.75	74.00	-14.75	Peak
2	4804.000	32.86	8.52	34.60	45.11	51.89	74.00	22.11	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 17
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2480MHz Tx		
M/N	: AEA1000/37		

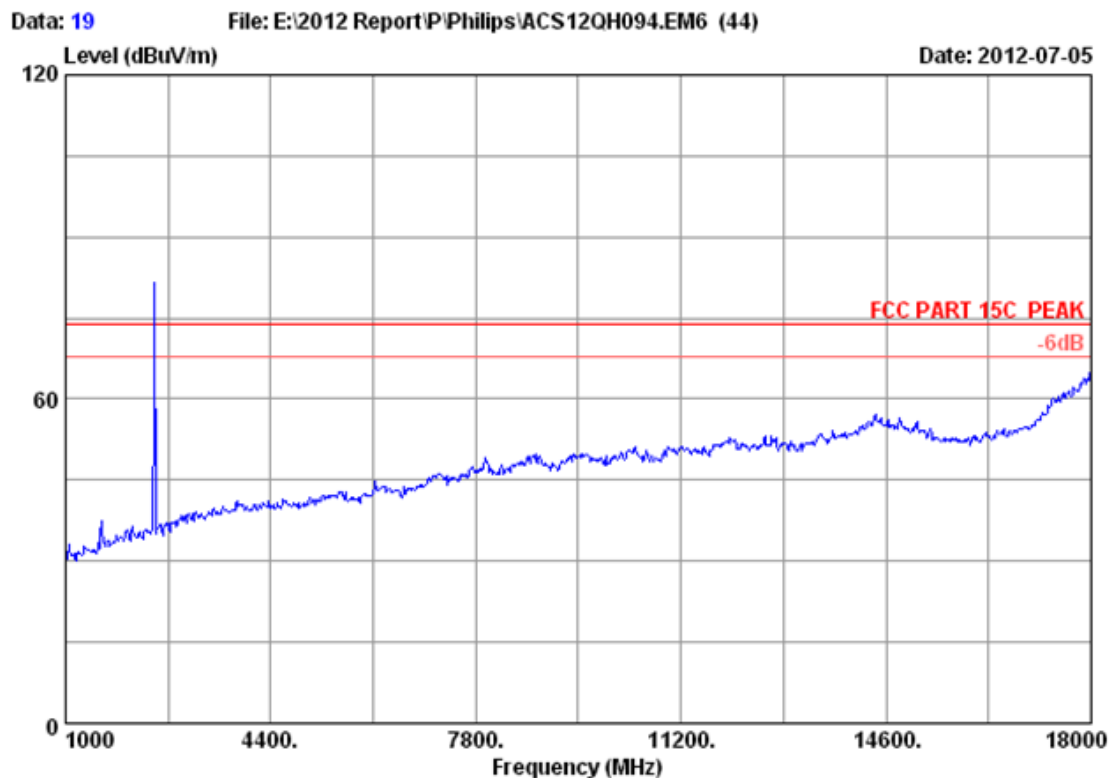


Site no. : 3m Chamber Data no. : 18
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : InRange
 Power supply : DC 3V
 Test mode : 2480MHz Tx
 M/N : AEA1000/37

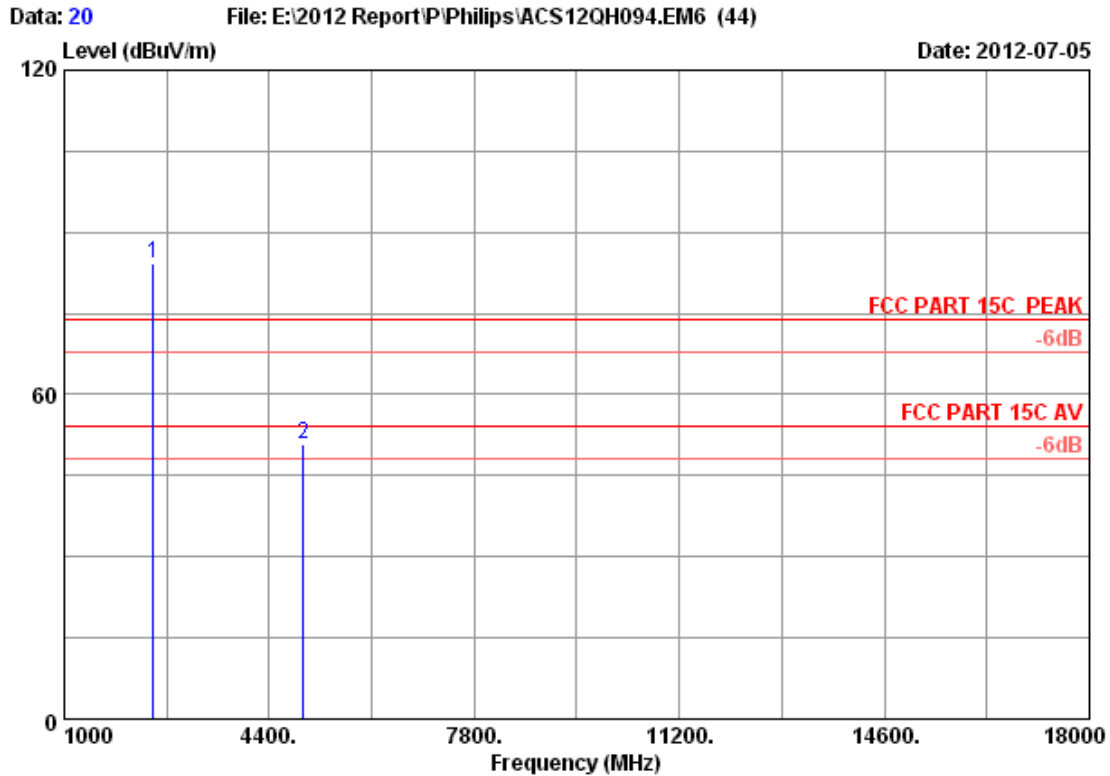
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	28.08	6.15	34.45	88.19	87.97	74.00	-13.97	Peak
2	4960.000	33.14	8.65	34.60	44.89	52.08	74.00	21.92	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 19
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK	Engineer	: Leo-Li
Env. / Ins.	: 23°C/54%		
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2480MHz Tx		
M/N	: AEA1000/37		

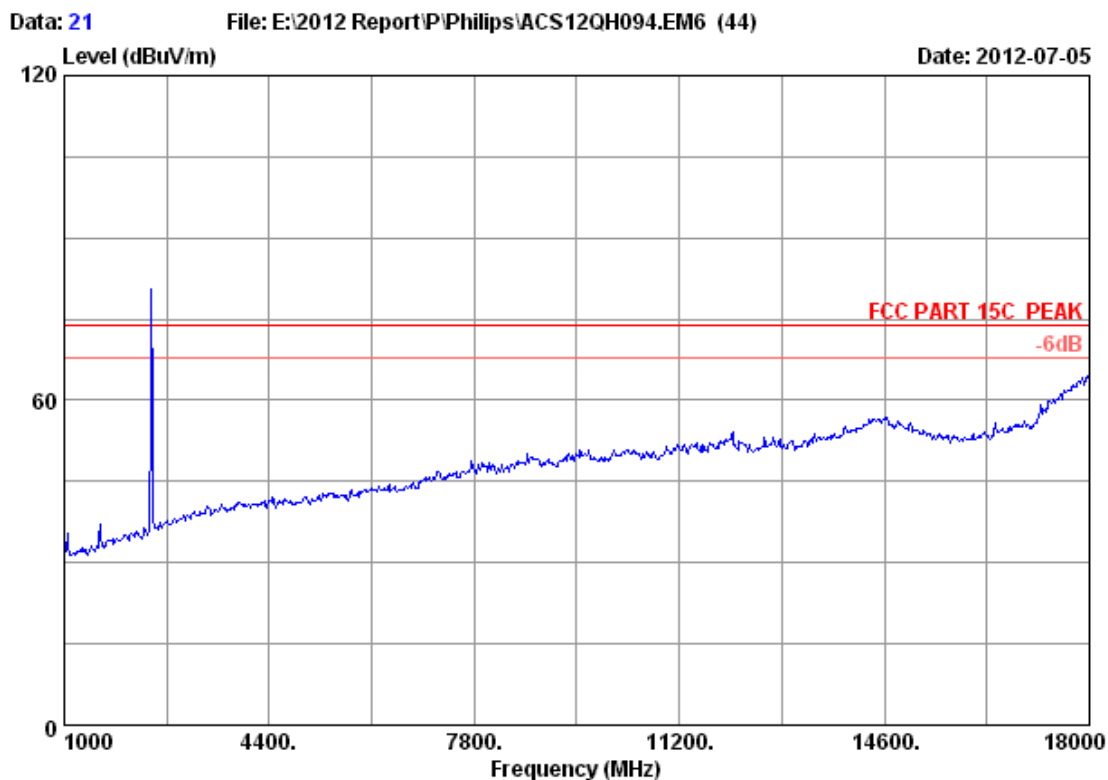


Site no. : 3m Chamber Data no. : 20
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : InRange
 Power supply : DC 3V
 Test mode : 2480MHz Tx
 M/N : AEA1000/37

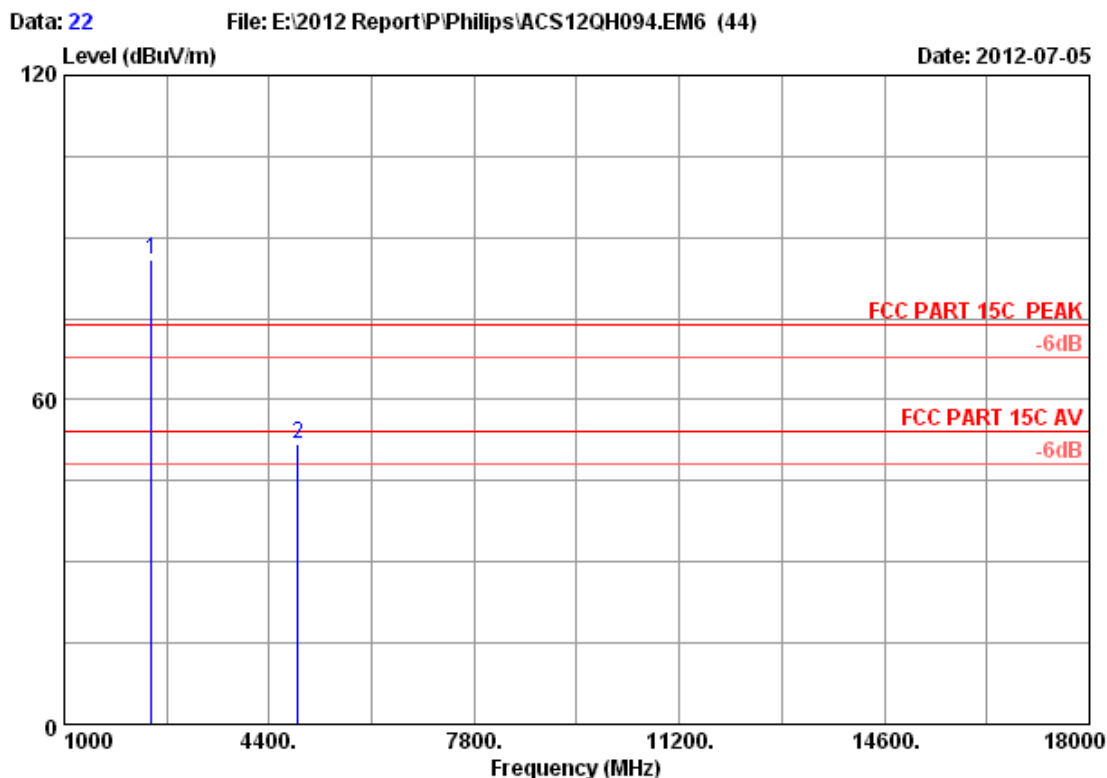
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	28.08	6.15	34.45	84.53	84.31	74.00	-10.31	Peak
2	4960.000	33.14	8.65	34.60	43.56	50.75	74.00	23.25	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 21
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2440MHz Tx		
M/N	: AEA1000/37		

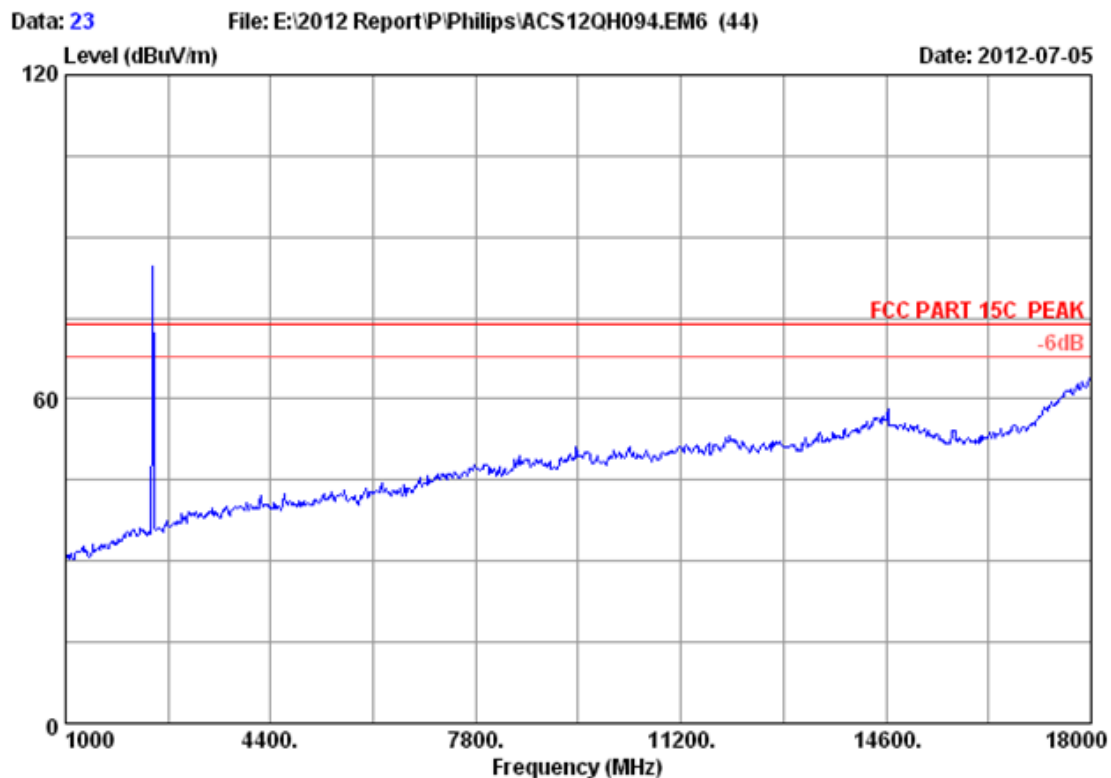


Site no.	: 3m Chamber	Data no.	: 22
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2440MHz Tx		
M/N	: AEA1000/37		

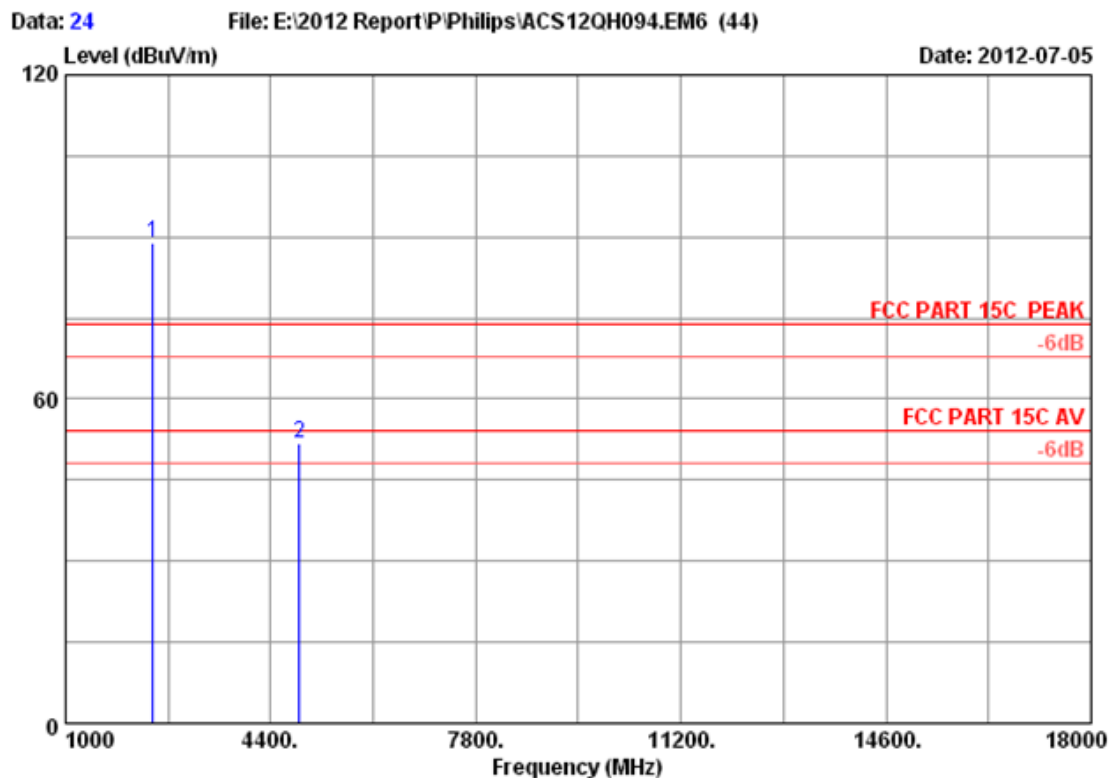
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.000	28.03	6.09	34.44	86.28	85.96	74.00	-11.96	Peak
2	4882.000	32.98	8.58	34.60	44.71	51.67	74.00	22.33	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 23
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2440MHz Tx		
M/N	: AEA1000/37		



Site no. : 3m Chamber Data no. : 24
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : InRange
 Power supply : DC 3V
 Test mode : 2440MHz Tx
 M/N : AEA1000/37

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.000	28.03	6.09	34.44	89.21	88.89	74.00	-14.89	Peak
2	4882.000	32.98	8.58	34.60	44.96	51.92	74.00	22.08	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

5. CONDUCTED SPURIOUS EMISSIONS

5.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08,12	1 Year
2.	Attenuator	Agilent	8491B	MY39262165	May.08,12	1 Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,12	1Year

5.2.Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

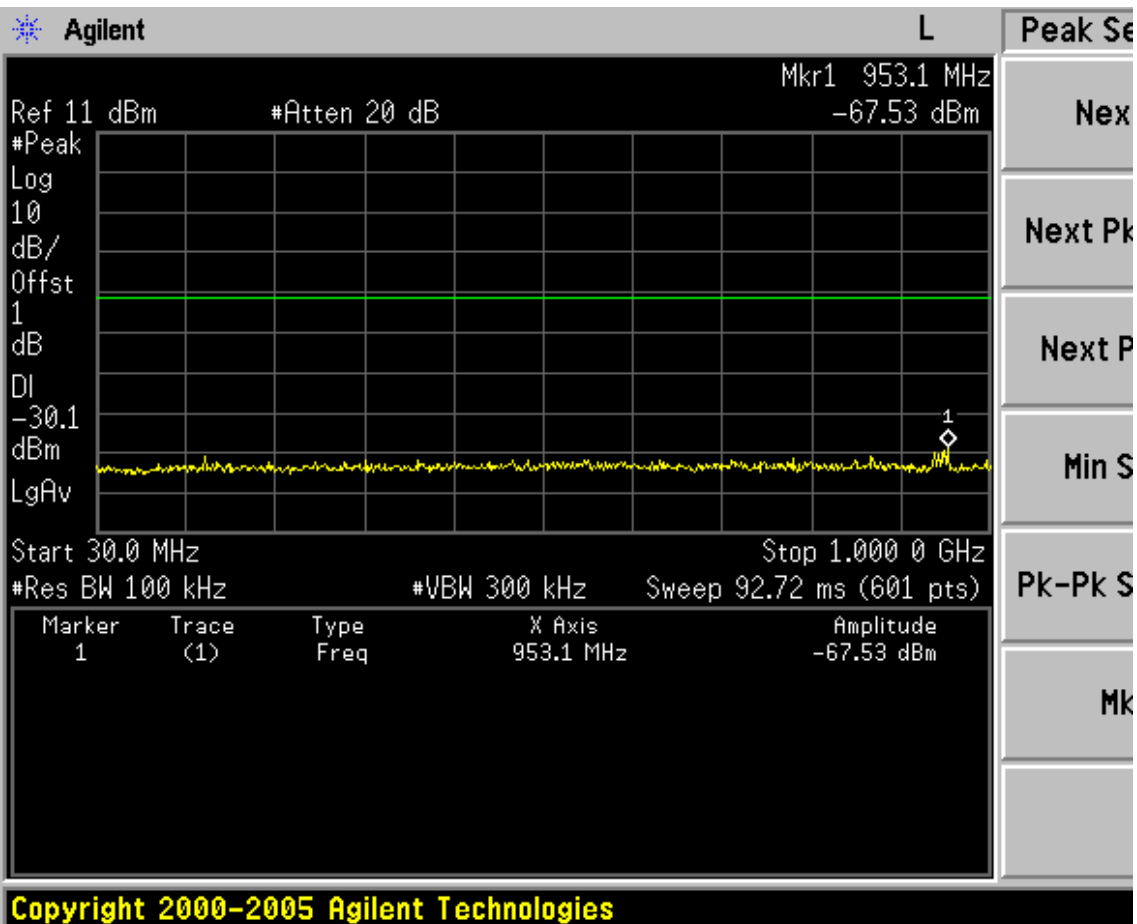
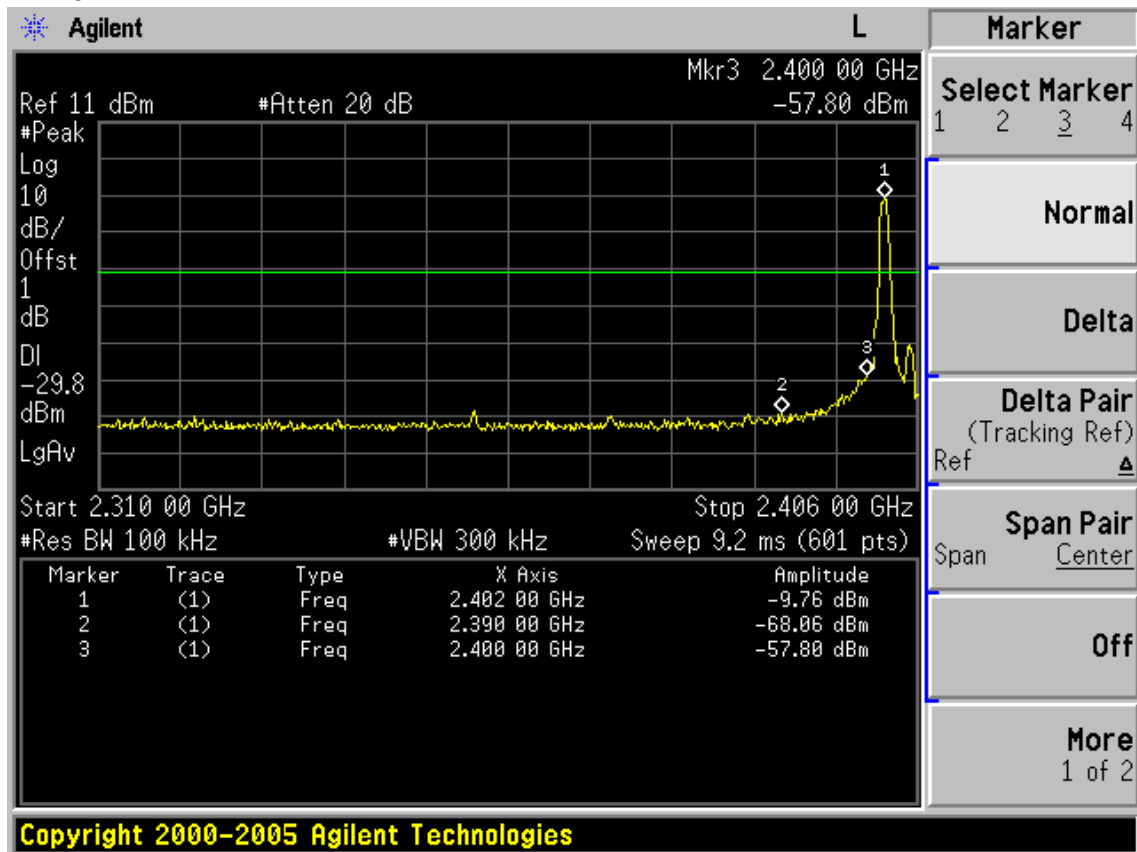
5.3.Test Procedure

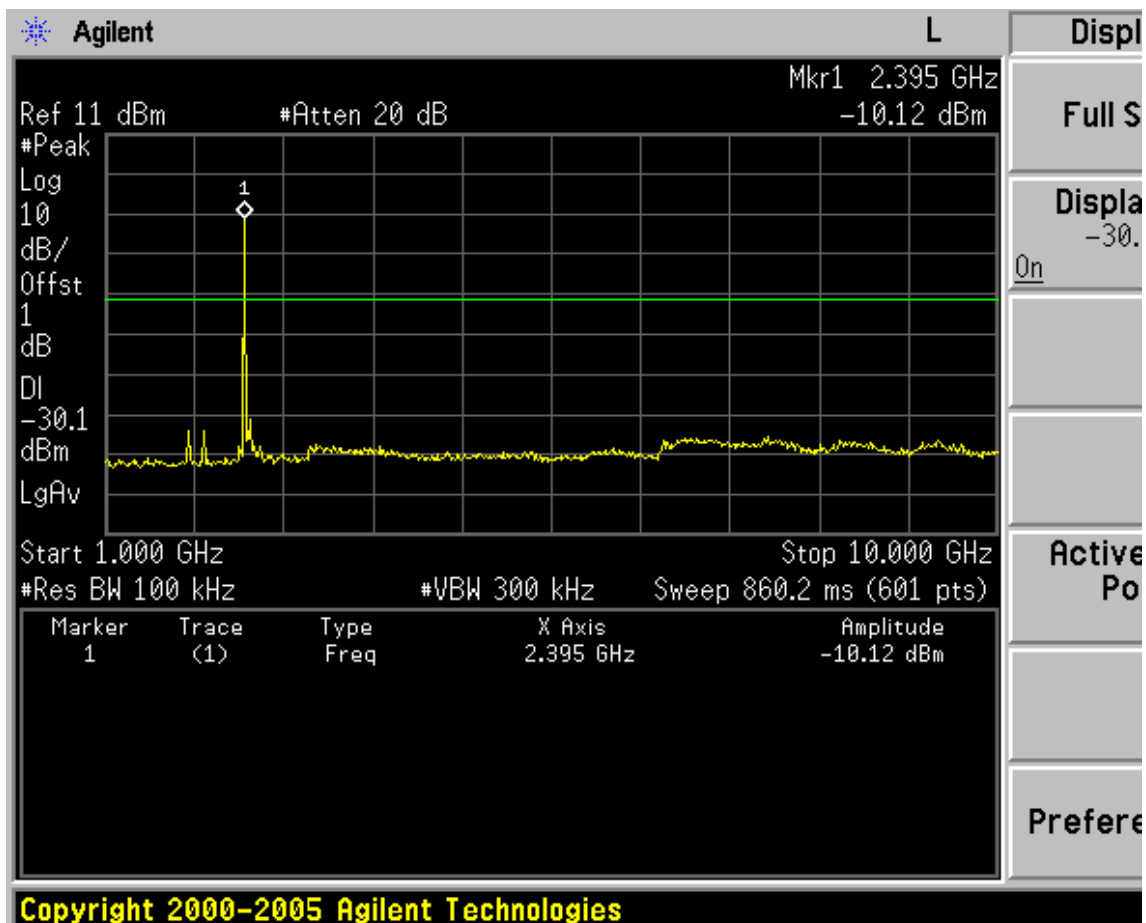
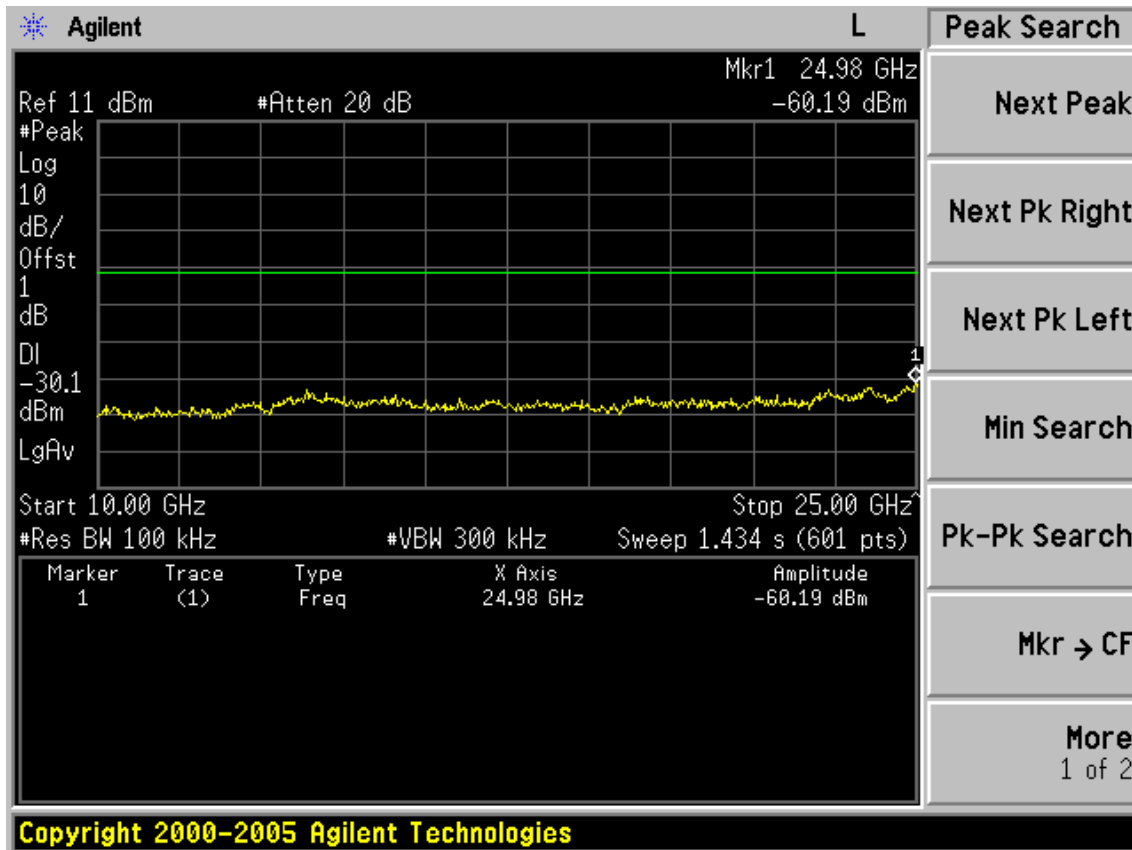
The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.

5.4.Test result

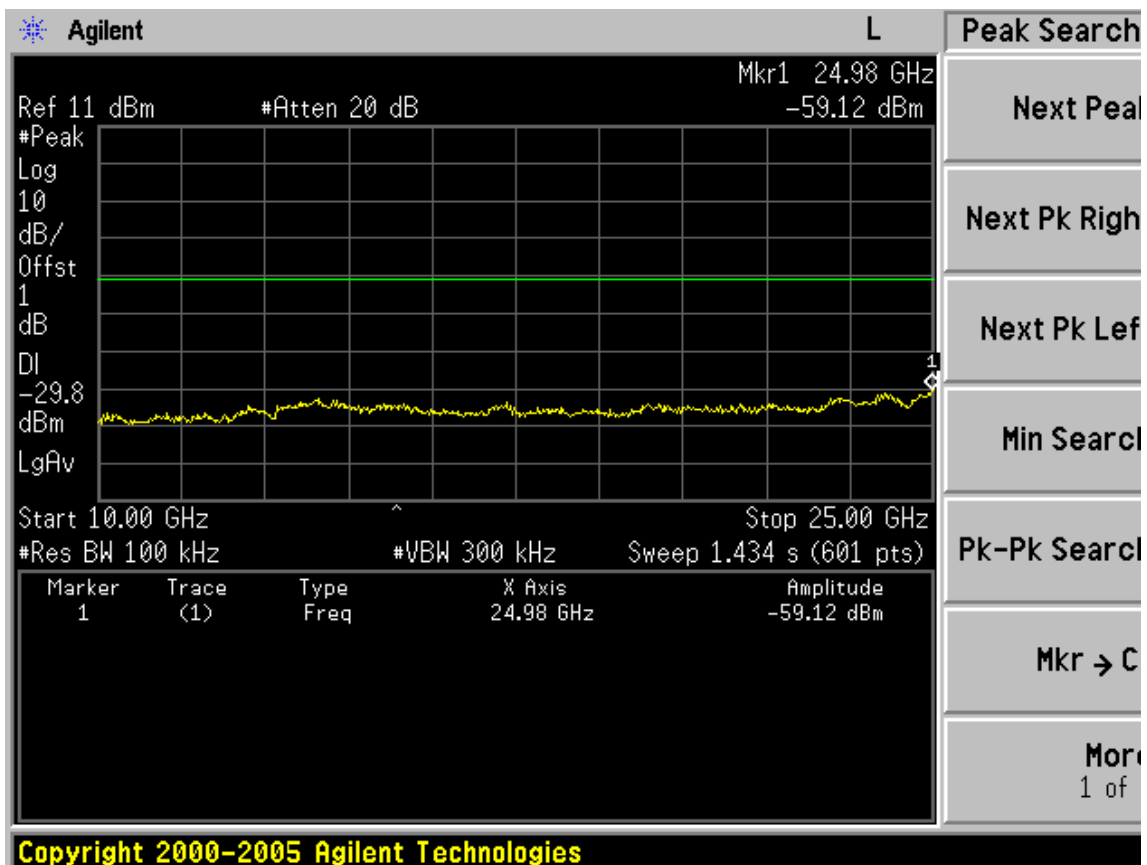
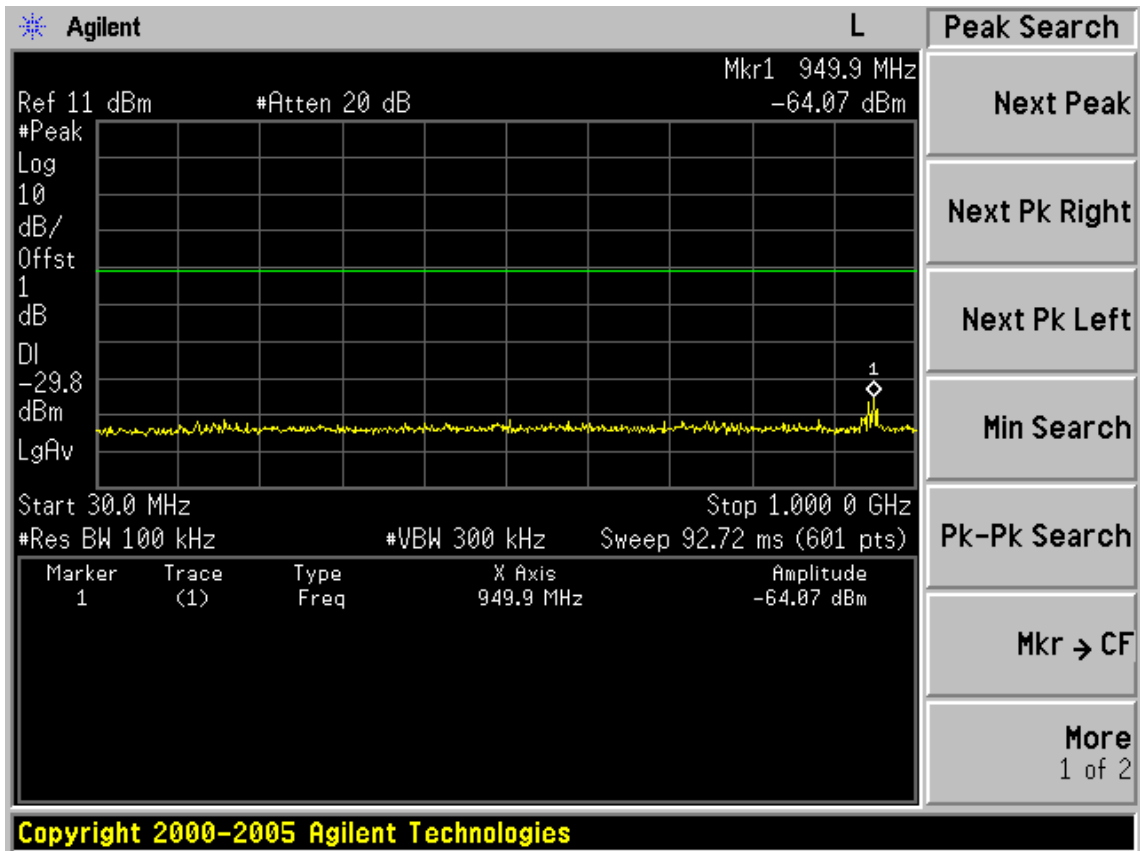
PASS (The testing data was attached in the next pages.)

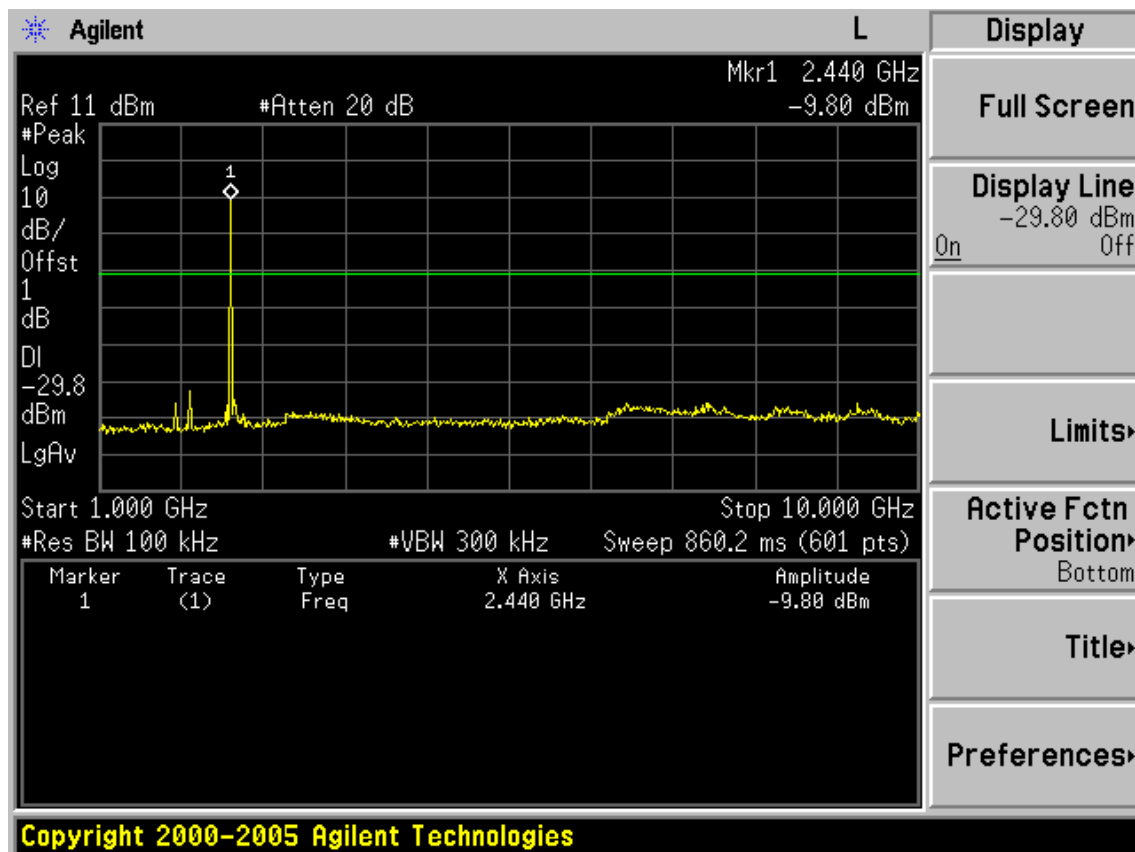
GFSK
2402MHz



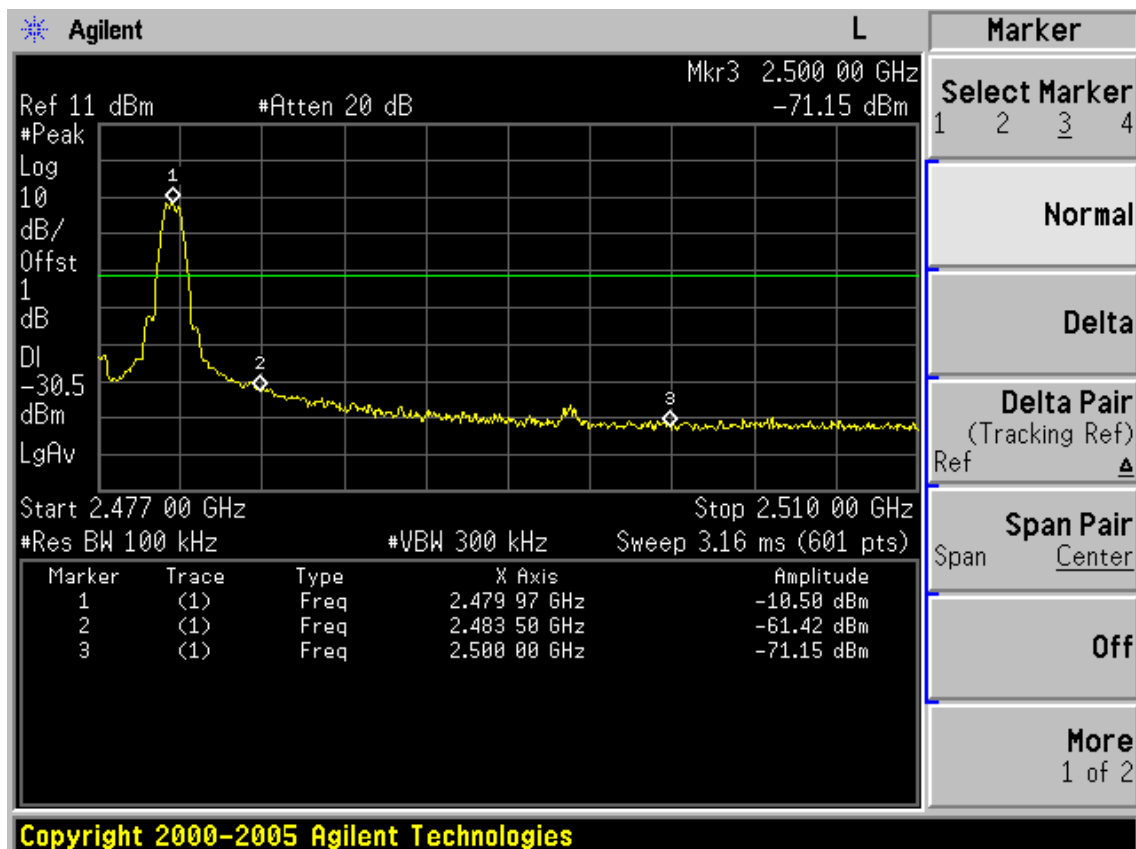


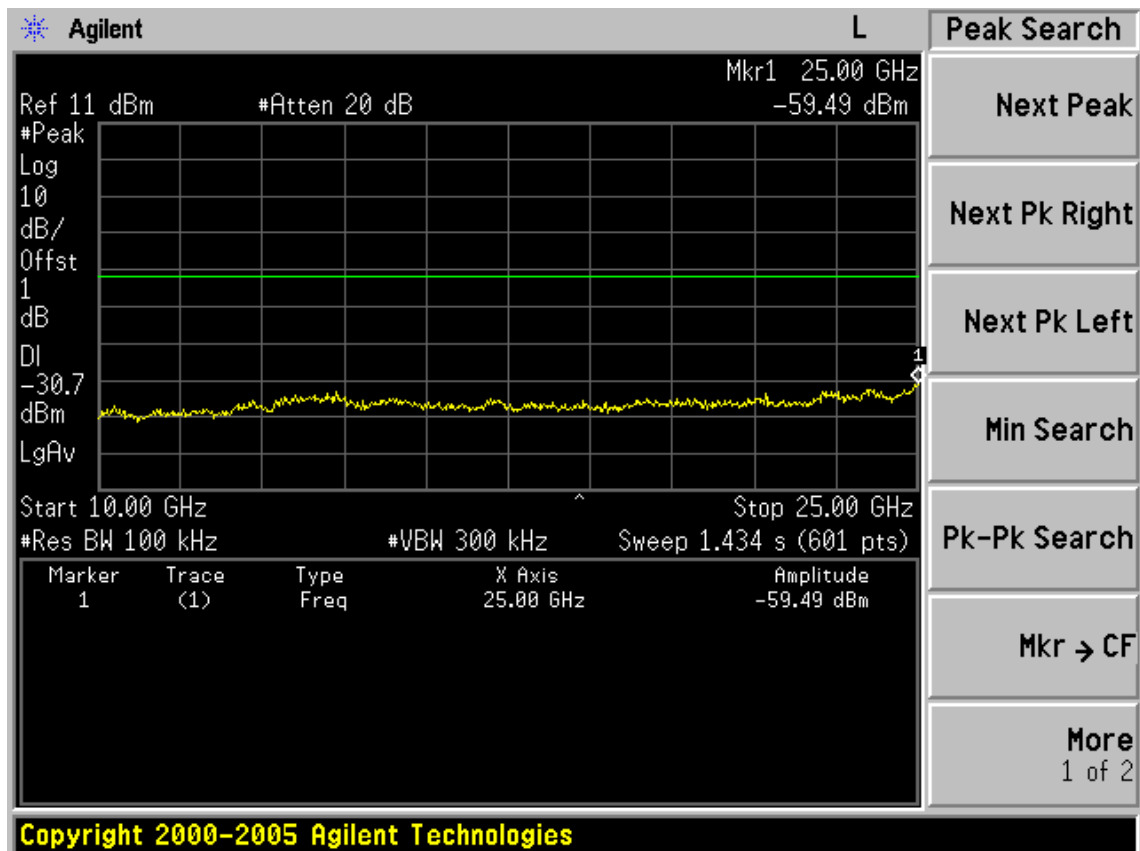
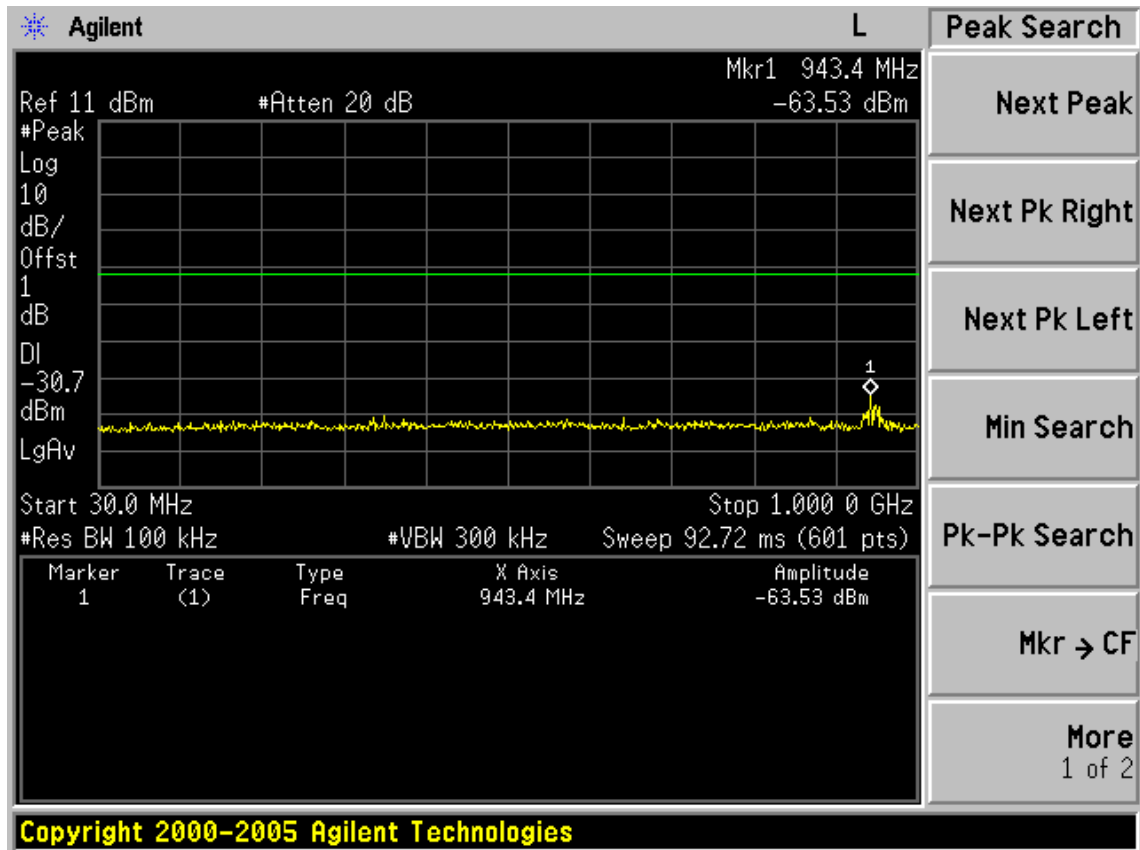
2440MHz

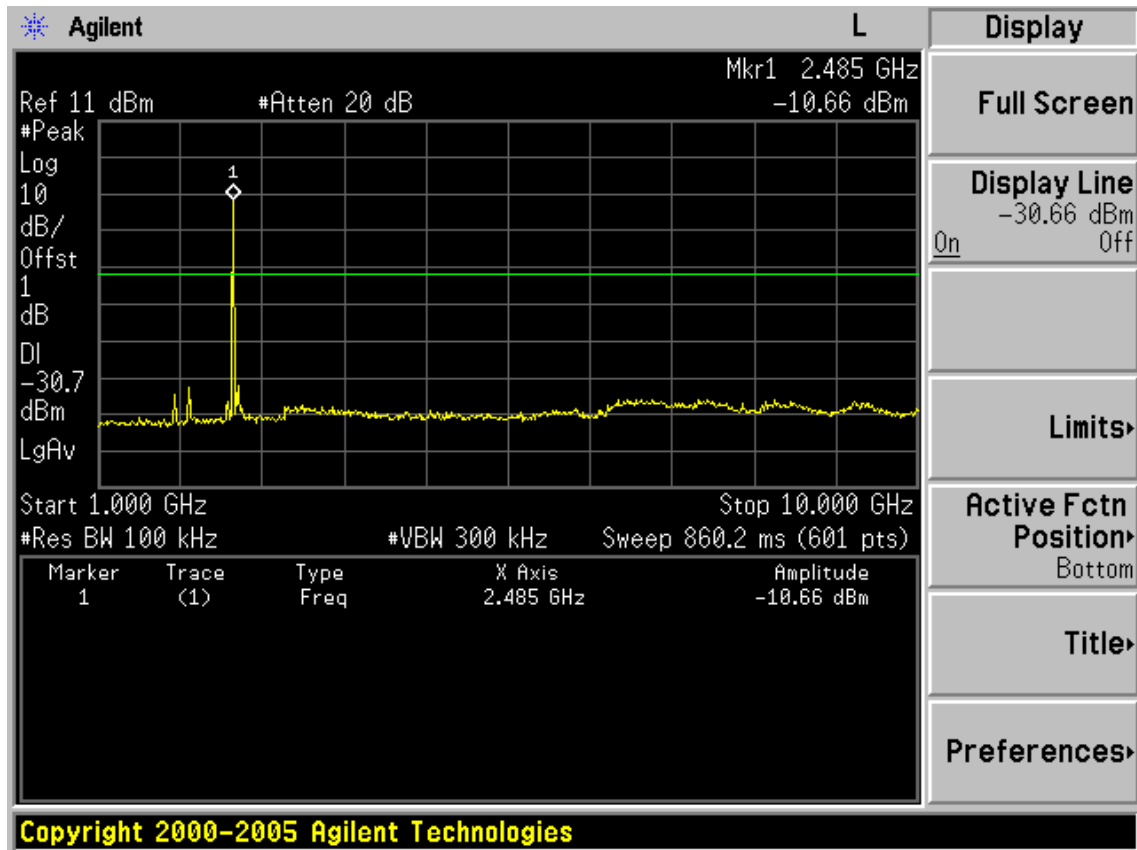




2480MHz







6. BAND EDGE COMPLIANCE TEST

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 12	1 Year
3.	Antenna	EMCO	3115	9510-4580	Nov.19, 11	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 12	1 Year

6.2. Limit

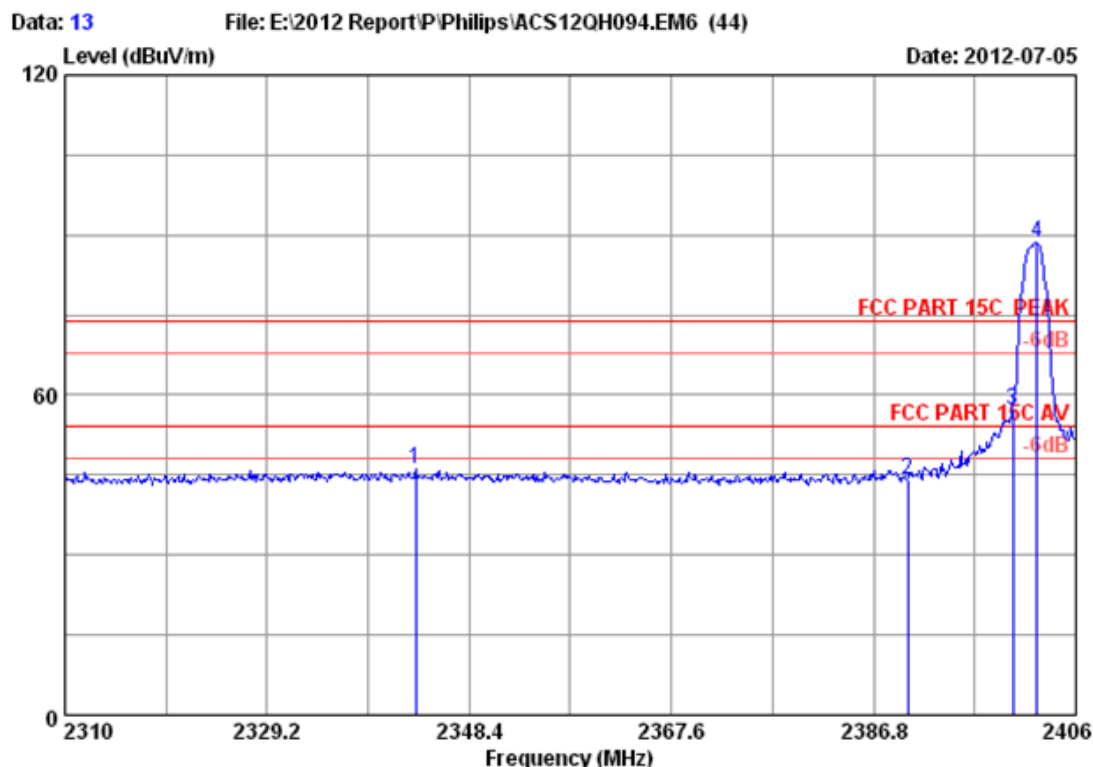
All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

6.3. Test Produce

1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=1MHz; VBW=3MHz; Sweep=AUTO
 - (b) This device is pulse modulated, a duty cycle factor was used to calculate average level based measured peak level

6.4. Test Results

Pass (The testing data was attached in the next pages.)

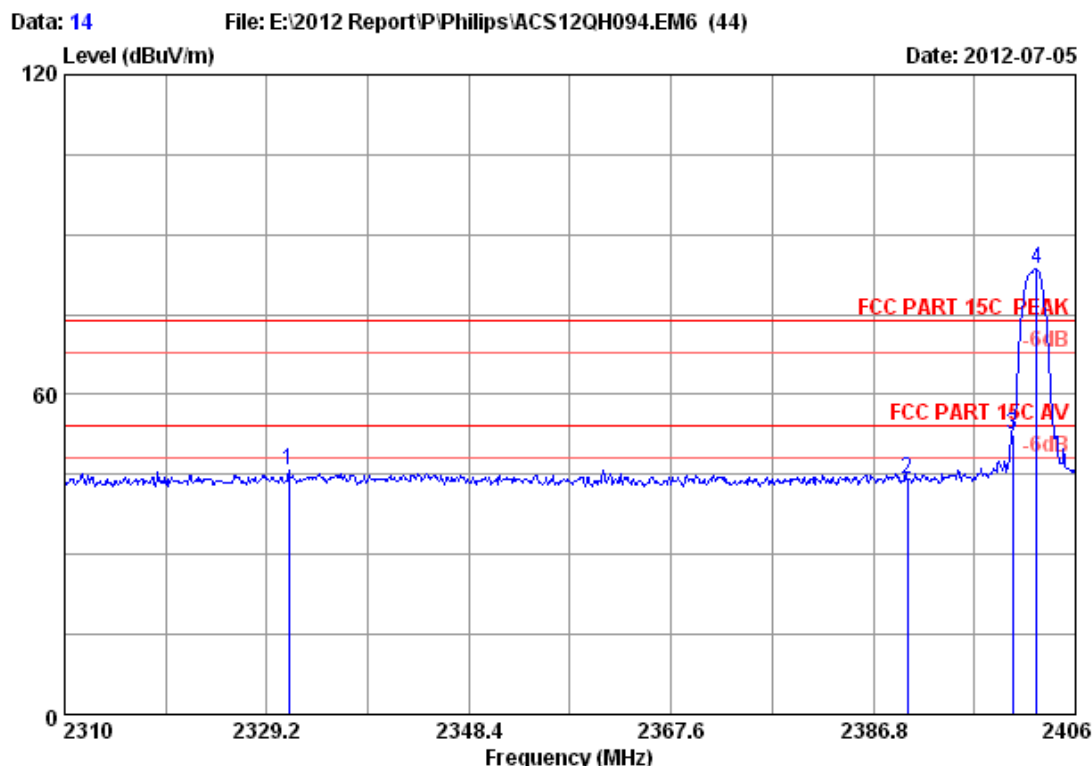


Site no.	: 3m Chamber	Data no.	: 13
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2402MHz Tx		
M/N	: AEA1000/37		

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2343.312	27.88	5.92	34.44	46.62	45.98	74.00	28.02	Peak
2	2390.000	27.96	6.01	34.44	44.45	43.98	74.00	30.02	Peak
3	2400.000	27.96	6.01	34.44	57.57	57.10	74.00	16.90	Peak
4	2402.352	27.96	6.03	34.44	89.04	88.59	74.00	-14.59	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

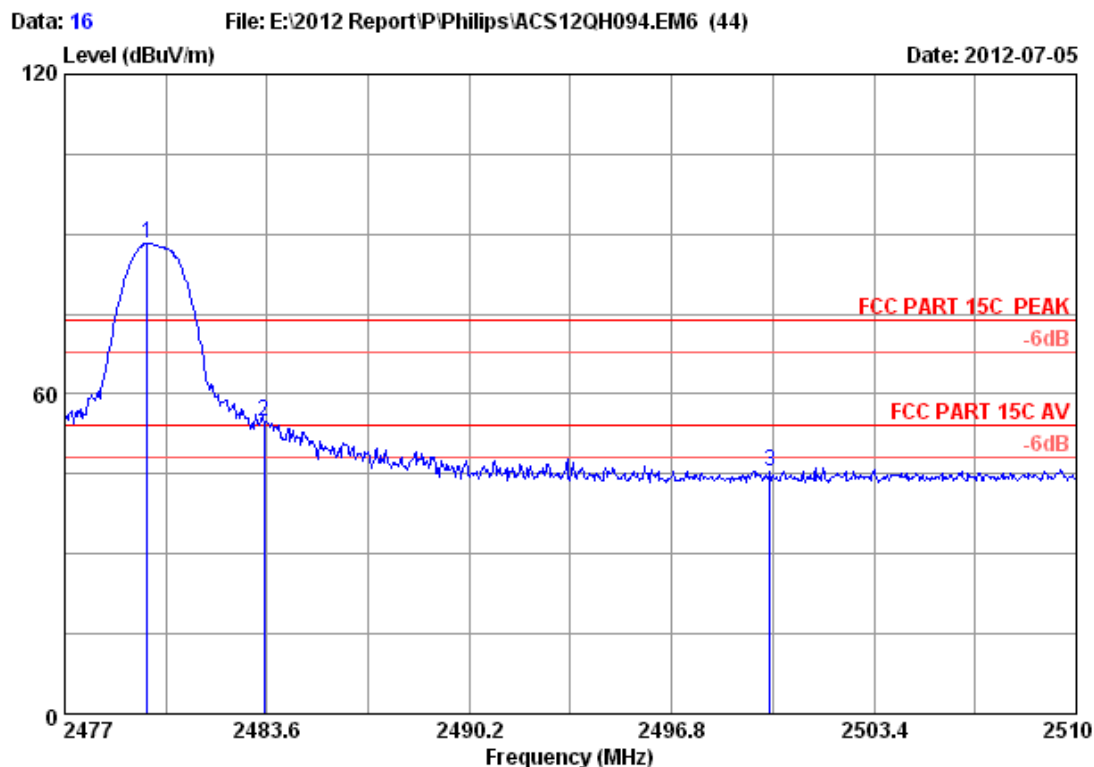


Site no. : 3m Chamber Data no. : 14
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : InRange
 Power supply : DC 3V
 Test mode : 2402MHz Tx
 M/N : AEA1000/37

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2331.312	27.86	5.92	34.43	46.32	45.67	74.00	28.33	Peak
2	2390.000	27.96	6.01	34.44	44.64	44.17	74.00	29.83	Peak
3	2400.000	27.96	6.01	34.44	53.10	52.63	74.00	21.37	Peak
4	2402.352	27.96	6.03	34.44	84.04	83.59	74.00	-9.59	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



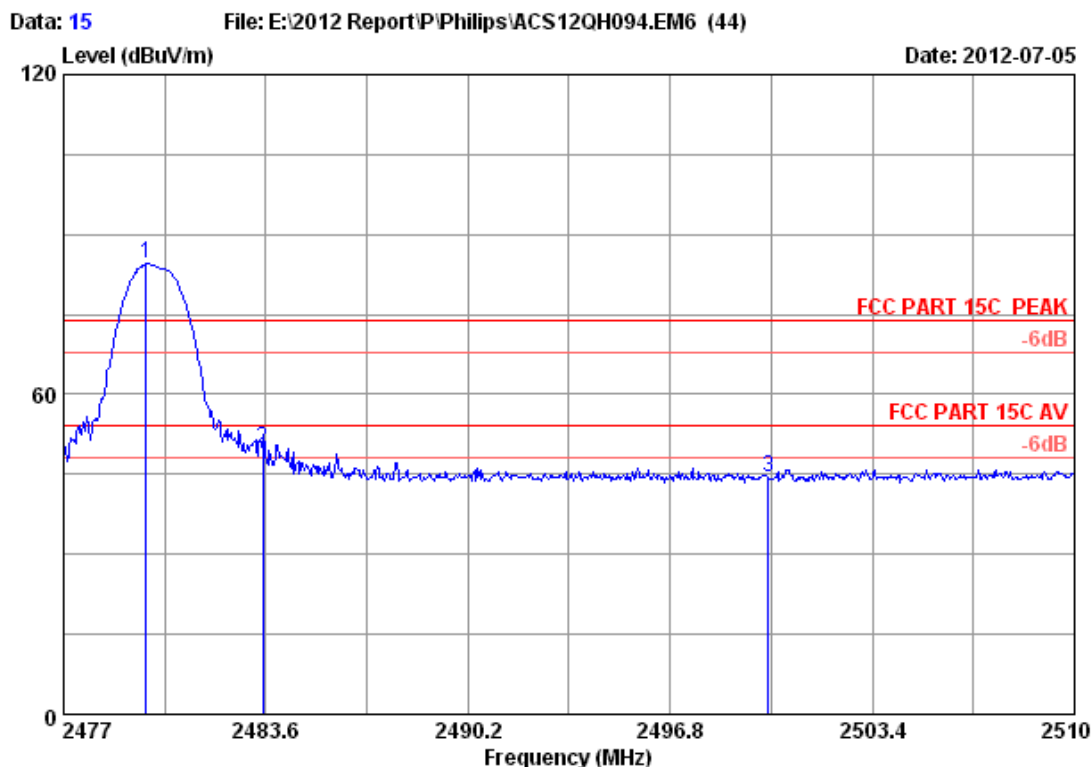
Site no. : 3m Chamber Data no. : 16
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : InRange
 Power supply : DC 3V
 Test mode : 2480MHz Tx
 M/N : AEA1000/37

	Ant.	Cable	Amp.		Emission				
Freq.	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1 2479.706	28.08	6.15	34.45	88.52	88.30	74.00	-14.30	Peak	
2 2483.500	28.08	6.15	34.45	55.08	54.86	74.00	19.14	Peak	
3 2500.000	28.10	6.18	34.45	45.77	45.60	74.00	28.40	Peak	

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Frequency (MHz)	Peak level (dBuV/m)	Duty cycle factor(dB)	AV level (dBuV/m)	Limit (dBuV/m)	Conclusion
2483.5	54.86	3.17	51.69	54	Pass



Site no.	: 3m Chamber	Data no.	: 15
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23°C/54%	Engineer	: Leo-Li
EUT	: InRange		
Power supply	: DC 3V		
Test mode	: 2480MHz Tx		
M/N	: AEA1000/37		

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.706	28.08	6.15	34.45	84.65	84.43	74.00	-10.43	Peak
2	2483.500	28.08	6.15	34.45	50.05	49.83	74.00	24.17	Peak
3	2500.000	28.10	6.18	34.45	44.58	44.41	74.00	29.59	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

7. 6dB Bandwidth Test

7.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 12	1 Year
3.	Antenna	EMCO	3115	9510-4580	Nov.19, 11	1Year
4.	HF Cable	Hubersuhner	Sucoflex104	-	May.08, 12	1 Year

7.2. Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

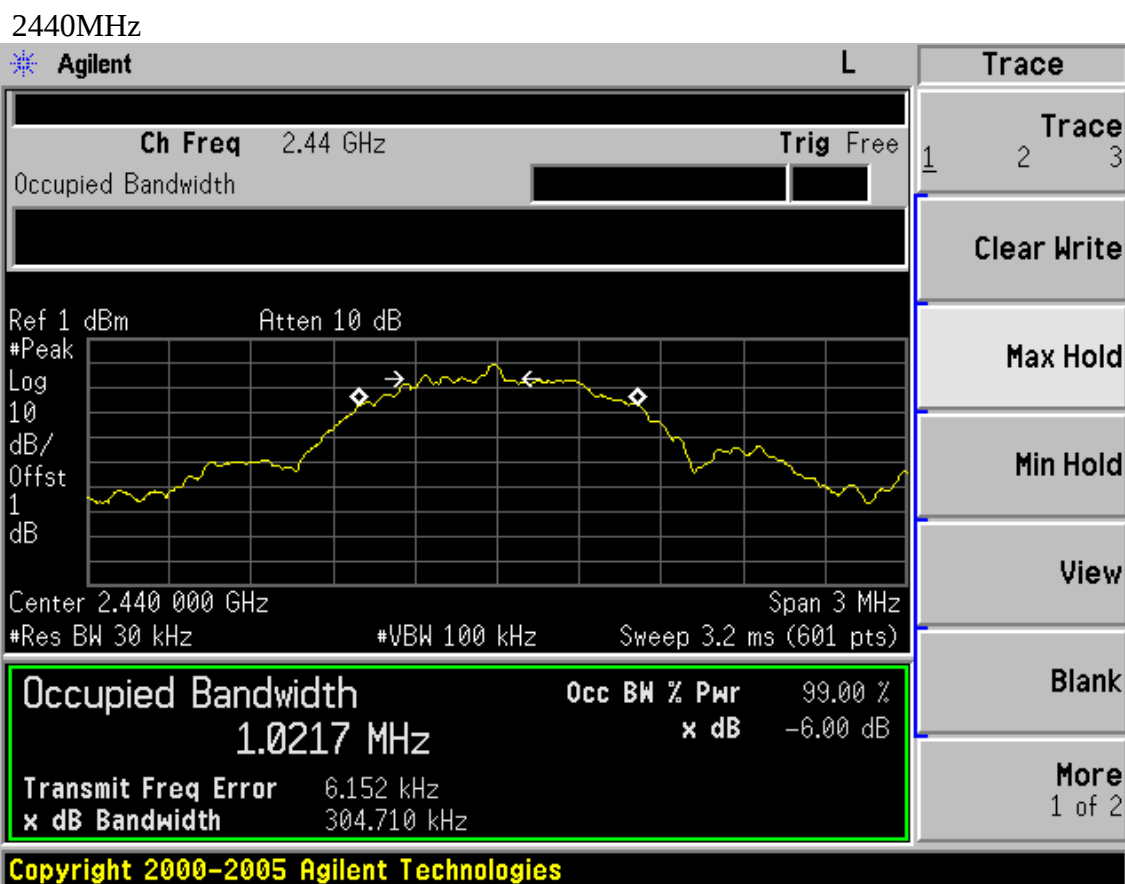
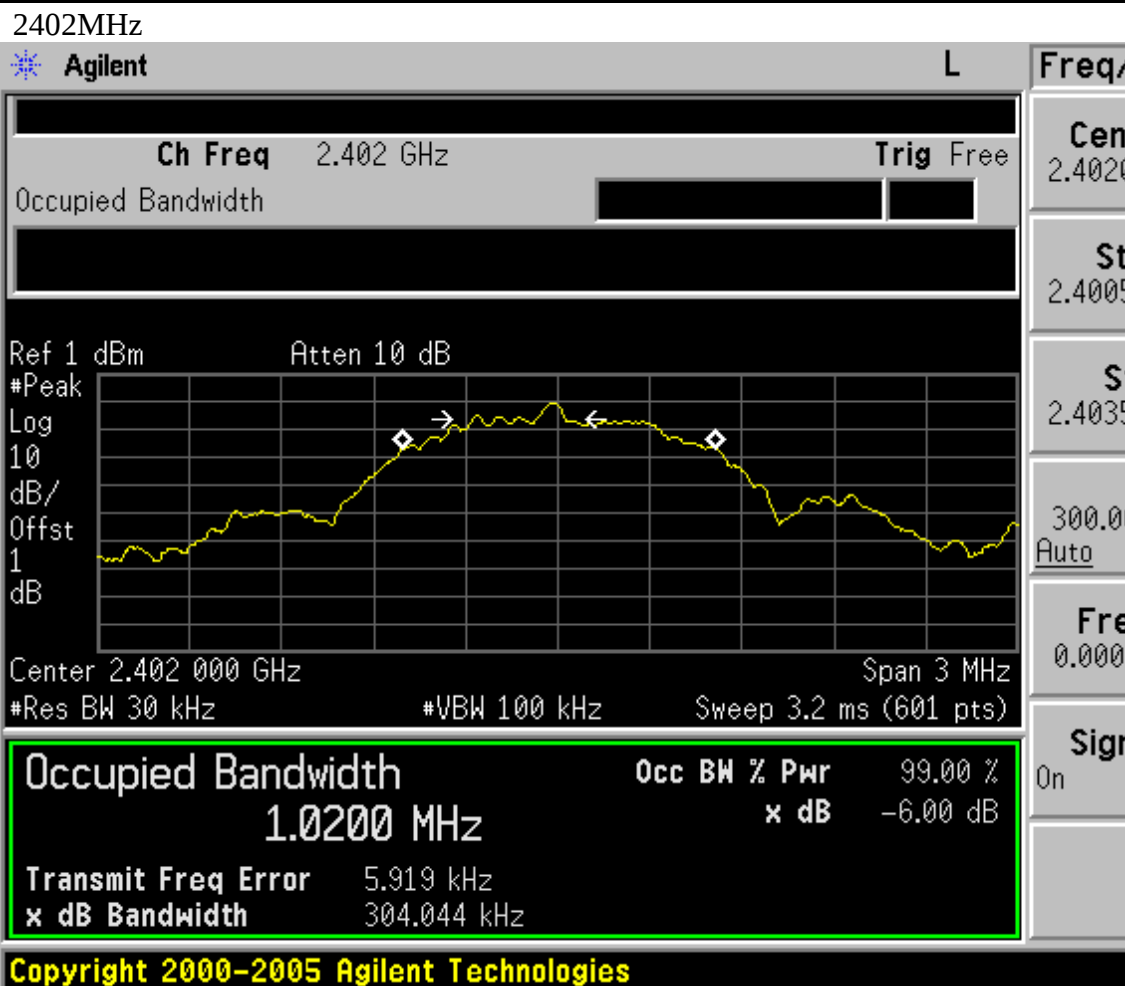
7.3. Test Procedure

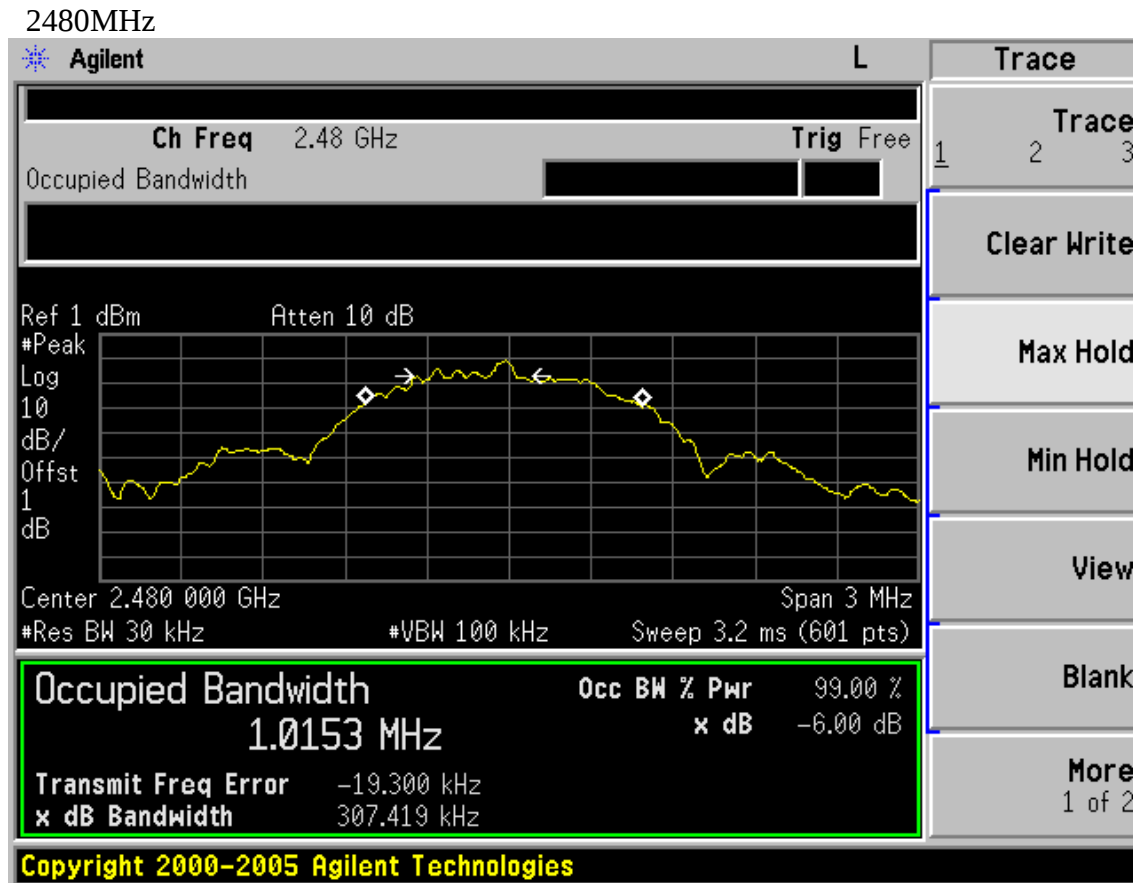
The transmitter output was connected to a spectrum analyzer, The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300 kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

7.4. Test Results

EUT: InRange		
M/N: AEA1000/37		
Test date: 2012-07-14	Pressure: 100.7 kpa	Humidity: 55.7%
Tested by: Leo-Li	Test site: RF Site	Temperature : 25.2 °C

Cable loss: 1.0 dB		Attenuator loss: 20 dB	Antenna Gain: 0 dBi
Test Mode	CH	6dB bandwidth (MHz)	Limit (KHz)
	2402	304.044	N/A
	2440	304.710	N/A
	2480	307.419	N/A
Conclusion : PASS			





8. OUTPUT POWER TEST

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 12	1 Year
3.	Antenna	EMCO	3115	9510-4580	Nov.19, 11	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 12	1 Year
1.	Power Meter	Anritsu	ML2487A	6K00002472	May.08, 12	1Year
2.	Power Sensor	Anritsu	MA2491A	033005	May.08, 12	1Year

8.2. Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

8.3. Test Procedure

1. Connected the EUT's antenna port to power meter Via suitable attenuation.
2. Read the Peak output power of the EUT from the power meter directly.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

8.4.Test Results

EUT: InRange			
M/N: AEA1000/37			
Test date: 2012-07-14		Pressure: 101.3 kpa	Humidity: 55.2%
Tested by: Leo-Li		Test site: RF site	Temperature: 25.3 °C
Cable loss: 1.5 dB		Attenuator loss: 20 dB	
Test Mode	CH (MHz)	Peak output Power (dBm)	Limit (dBm)
GFSK	2402	-8.87	30
	2440	-8.02	30
	2480	-7.98	30
Conclusion: PASS			

9. POWER SPECTRAL DENSITY TEST

9.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 12	1 Year
3.	Antenna	EMCO	3115	9510-4580	Nov.19, 11	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 12	1 Year

9.2. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

9.3. Test Procedure

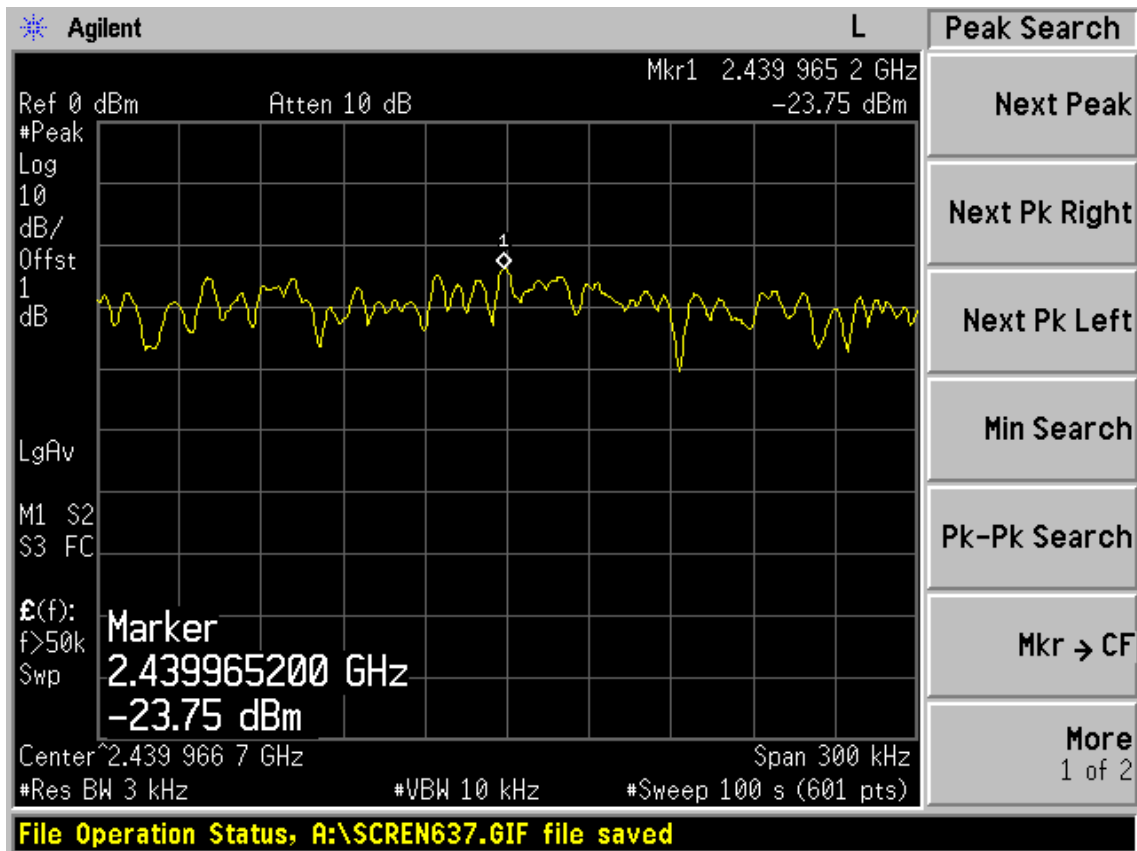
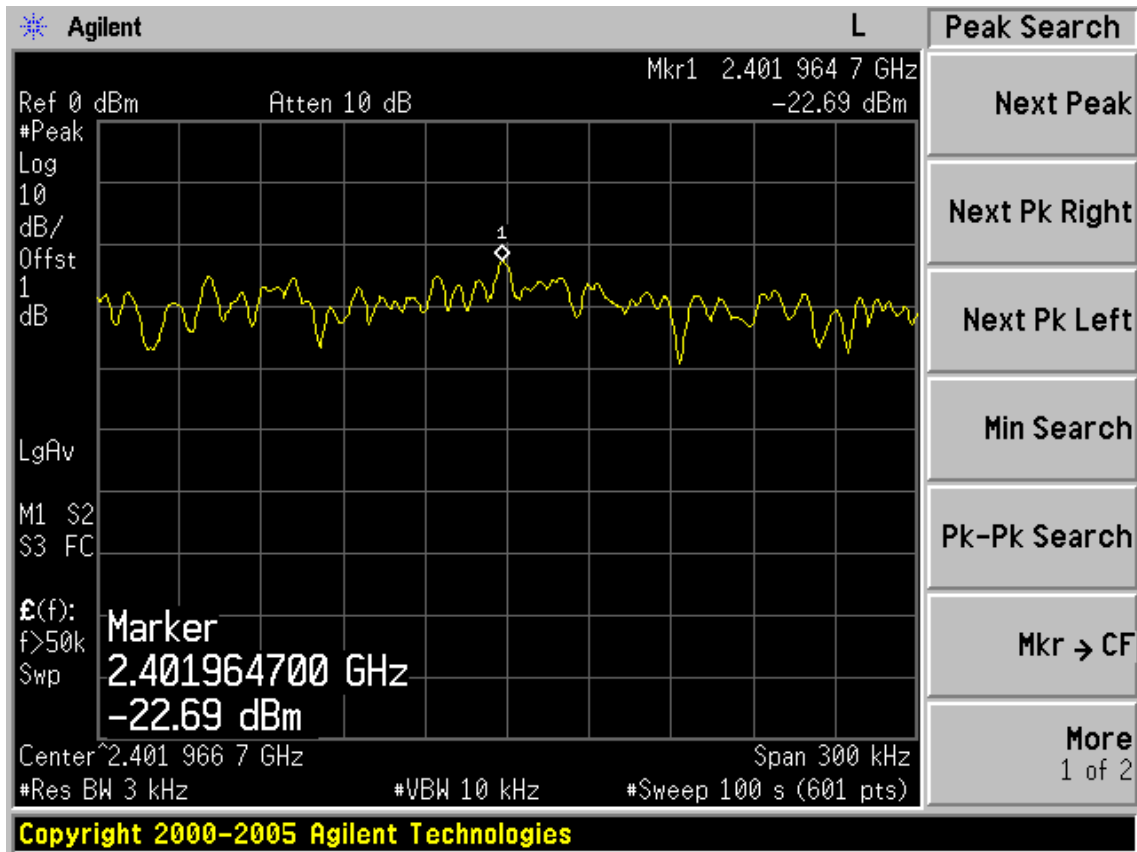
1. Connected the EUT's antenna port to spectrum analyzer device by 20dB attenuator.
2. Set the test frequency as center frequency, Set RBW=3KHz, VBW=10KHz, Span large enough capture the entire frequency, Read out maximum peak level frequency
3. Set the frequency read from produce 2 as center frequency, then set the span=300KHz, Sweep time=Span/RBW, Then Max hold, read out each mode and each chain's Power density.

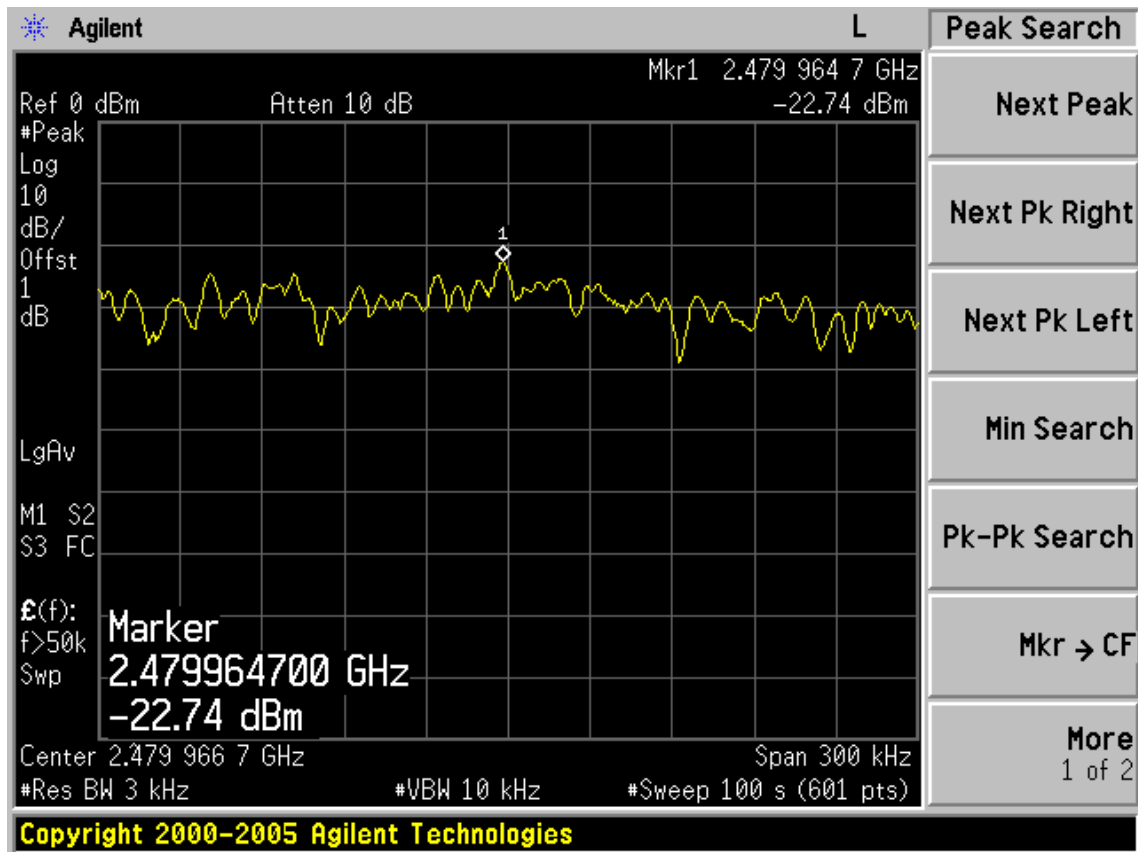
Note: The cable loss and attenuator loss were offset into measure device as an amplitude

9.4.Test Results

EUT: InRange		
M/N:AEA1000/37		
Test date: 2012-07-14	Pressure: 101.2Kpa	Humidity: 53.7%
Tested by: Leo-Li	Test site: RF site	Temperature : 24.6 °C

Test Mode	CH	Result	Limit
		(dBm/MHz)	(dBm/MHz)
GFSK	CH0	-22.69	8
	CH19	-23.75	8
	CH39	-22.74	8
Conclusion : PASS			





10. ANTENNA REQUIREMENT

10.1. STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2. ANTENNA CONNECTED CONSTRUCTION

The antennas used for this product are PCB antenna that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 0dBi.

11.DEVIATION TO TEST SPECIFICATIONS

[NONE]