Test Report of FCC Part 15 C for FCC Certificate

On Behalf of

Graupner GmbH & Co. KG

FCC ID:	**ZKZ-MC-32**
Product Description:	**ComputerSystem Graupner HoTT**
Model No.:	**mc-32**
Trade Mark:	**HoTT**
Prepared for:	**Graupner GmbH & Co. KG** Henriettenstr. 94-96 D-73230 Kirchheim Teck,Germany
Prepared by:	**Shenzhen Laker Testing Technology Co.,Ltd** 15C，Block 1,Sunshine Huayi Building,Nanhai West Road, Nanshan, Shenzhen, China Tel: 86-755-86307736 Fax: 86-755-86307736
Report No.:	LK11KR-00218E
Issue Date:	December 10, 2011
Test Date:	December 01~10, 2011

Test by: **Reviewed By:**

Owen Li

Owen Li

Edmund Zou

Edmund Zou

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	**Graupner GmbH & Co. KG**
Address of applicant:	Henriettenstr. 94-96 D-73230 Kirchheim Teck,Germany
Manufacturer:	**SJ TECHNOLOGY(SHENZHEN)CO.,LTD**
Address of manufacturer:	F6,1 Bldg,A Area,Yintianxifa Industrial Area,Xixiang Town, Baoan District Shenzhen,Guangdong Province,China

General Description of E.U.T

Items	Description
EUT Description:	ComputerSystem Graupner HoTT
Model No.:	mx-32
Type of Modulation:	FHSS
Frequency Band:	2404.056 MHz ~ 2474.025 MHz
Number of Channels:	70
Channel Bandwidth:	1.014 MHz
Antenna Type:	SMA Straight Plug Reverse
Antenna Gain:	2.0dBi
Rated Voltage:	4.2VDC from battery

** The test data gathered are from the production sample provided by the manufacturer.*

1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2009.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.207, and 15.247 rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

All measurement required was performed at laboratory of Centre Testing International (ShenZhen) Corporation ,Location at Hongwei Industrial Zone, Baoan 70 District, Shenzhen, Guangdong, The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards.

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 510007

CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION,EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. Registration 338263, March 20，2009.

IC Registration No.: 7408B

The 3m alternate test site of CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7408B on December 29，2009.

CNAS - Registration No.: L1910

CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION,. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.The acceptance letter from the CNAS is maintained in our files: Registration:L1910,January 12,2010.

2. SYSTEM TEST CONFIGURATION

The tests documented in this report were performed in accordance with ANSI C63.4-2009 and FCC CFR 47 Part 15 Subpart C.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2009.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2009.

2.4 List of Measuring Equipments Used

Test equipments list of CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION.

Shielding Room No. 1 - Conducted disturbance Test				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
Receiver	R&S	ESCI	100009	07/06/2012
LISN	ETS-LINDGREN	3850/2	00051952	03/29/2012
LISN	R&S	ENV216	100098	07/06/2012
Voltage Probe	R&S	ESH2-Z3	100042	07/06/2012
Current Probe	R&S	EZ17	100106	07/06/2012
ISN	TESEQ GmbH	ISN T800	30297	02/14/2012
Control Room - Conducted disturbance Test (10m part)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
Receiver	R&S	ESCI	100435	07/06/2012
LISN	schwarzbeck	NNLK8121	8121-529	07/06/2012
Voltage Probe	R&S	ESH2-Z3	100042	07/06/2012
Current Probe	R&S	EZ17	100106	07/06/2012

Shielding Room No. 2 - Harmonic / Flicker Test (EN 61000-3-2) / (EN 61000-3-3)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
5KVA AC POWER SOURCE	California instruments	5001iX-400-413	57344	03/29/2012
Flicker & Harmonic Tester	California instruments	PACS-1	72492	03/29/2012
Shielding Room No. 2 - Power-frequency magnetic fields Test (IEC 61000-4-8)				
Compact Generator	EM-Test	UCS500M/6B	V0603101093	07/06/2012
Induction Coil	EM-Test	MS100	0106-02	03/29/2012
Current Transformer	EM-Test	MC2630	0106-02	03/29/2012
Shielding Room No. 2 –Voltage dips and interruptions Test (IEC 61000-4-11)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
5KVA AC POWER SOURCE	California instruments	5001iX-400-413	57344	03/29/2012
Electronic output switch	California instruments	EOS-1	72616	03/29/2012
Shielding Room No. 2 - Continuous conducted disturbances Test (IEC 61000-4-6)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
Signal Generator	IFR	2023B	202307/883	03/29/2012
Power Amplifier	AR	75A 250A	320297	03/29/2012
Attenuator	EM-Test	ATT6/75	0320837	07/06/2012
CDN	EM-Test	CDN M2/M3	0204-01	07/06/2012
EM-Clamp	EM-Test	EM101	35770	07/06/2012

Shielding Room No. 3 - ESD Test (IEC 61000-4-2)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
ESD Simulator	EM TEST	ESD30C	V0603101091	04/05/2012
Shielding Room No. 3 - EFT / Surges Test (IEC 61000-4-4) (IEC 61000-4-5)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
Compact Generator	EM-Test	UCS500M/6B	V0603101093	07/06/2012
Capacitive Clamp	EM-Test	C Clamp HFK	0306-43	07/06/2012
CDN for Telecom Port	EM-Test	CNV504S1	V0603101094	07/06/2012

3M Semi-anechoic Chamber - Radiated disturbance Test				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2012
Spectrum Analyzer	Agilent	E4440A	MY46185649	07/06/2012
Biconilog Antenna	ETS-LINGREN	3142C	00044562	07/06/2012
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Horn Antenna	ETS-LINGREN	3117	00057407	07/06/2012
Microwave Preamplifier	Agilent	8449B	3008A02425	07/06/2012

10M Semi-anechoic Chamber - Radiated disturbance Test				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
Receiver	R&S	ESCI	100435	07/06/2012
Spectrum Analyzer	R&S	FSP40	100416	07/06/2012
Biconilog Antenna	schwarzbeck	VULB9136	9136-401	07/06/2012
Horn Antenna	ETS-LINGREN	3117	00044562	07/06/2012
Microwave Preamplifier	Agilent	8449B	3008A02425	07/06/2012
Microwave Preamplifier	Agilent	11909A	186871	07/06/2012

3M Full-anechoic Chamber - Continuous radiated disturbances Test (IEC 61000-4-3)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Due Date**
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2012
ESG Vector signal generators	Agilent	E4438C	MY45095744	03/29/2012
Power Amplifier	AR	150W1000	0322288	07/06/2012
Biconilog Antenna	ETS-LINGREN	3142C	00044562	07/06/2012

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
15.207	Conducted Emission	N/A
15.247(a)(1)	Hopping Channel Bandwidth	Pass
15.247(a)(1)	Hopping Channel Separation	Pass
15.247(a)(1)	Number of Hopping Frequency Used	Pass
15.247(a)(1)(iii)	Dwell Time of Each Frequency	Pass
15.247(b)(1)	Maximum Peak Output Power	Pass
15.247(d)	Band Edges Emission	Pass
15.247(d)	Spurious Radiated Emission	Pass
15.203/15.247(b)/(c)	Antenna Requirement	Pass

4. Test of Hopping Channel Bandwidth

4.1 Applicable Standard

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

4.2 EUT Setup

Spectrum Analyzer

4.3 Test Equipment List and Details

See section 2.4.

4.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 30KHz and VBW to 100KHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.

4. The spectrum width with level higher than 20dB below the peak level.

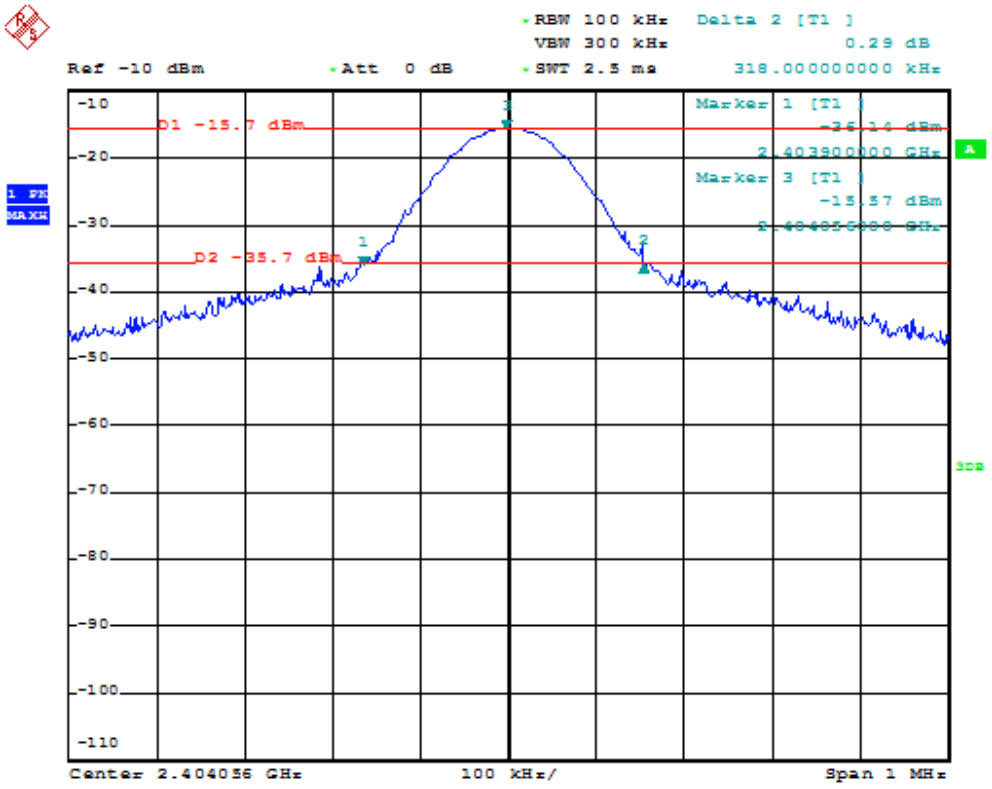
5. Repeat above 1~3 points for the middle and highest channel of the EUT.

4.5 Test Result

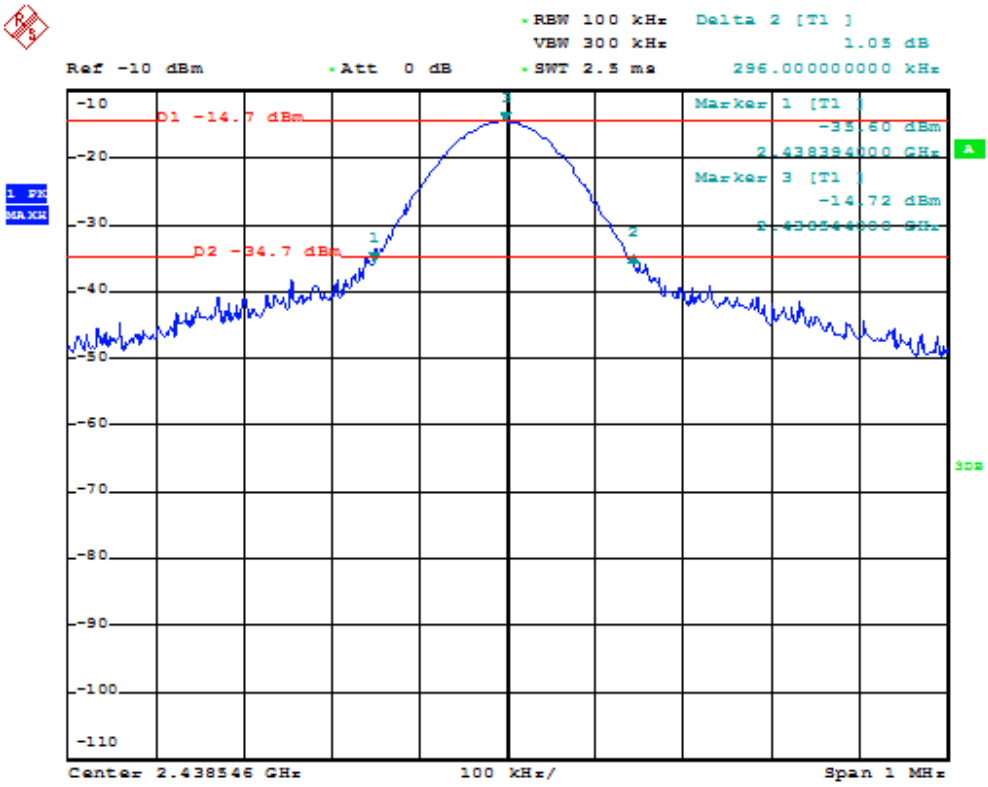
Temperature (℃) : 22~23	EUT: ComputerSystem Graupner HoTT
Humidity (%RH): 50~54	M/N: mc-32
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

Modulation Type	Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)
FHSS	Low	2404.056	318
FHSS	Middle	2438.546	296
FHSS	High	2474.025	306

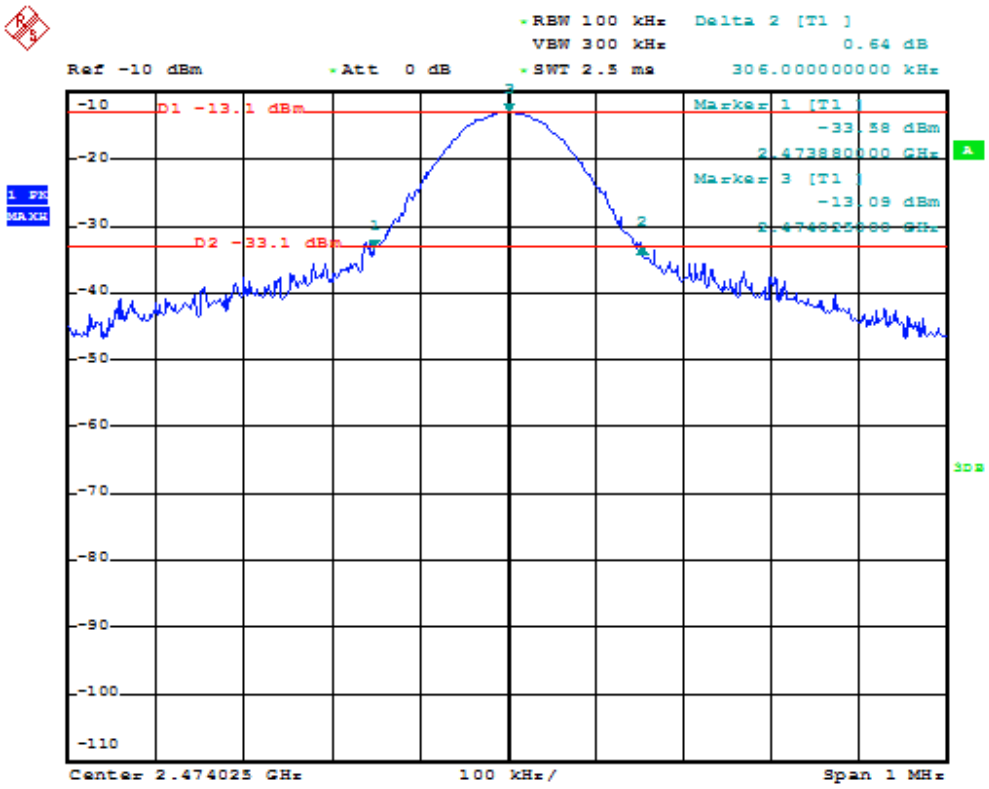
Channel Low：


RBW 100 kHz
VBW 300 kHz
SWT 2.5 ms
Delta 2 [T1]
0.29 dB
318.000000000 kHz
Ref -10 dBm
Att 0 dB
Marker 1 [T1]
-36.14 dBm
2.403900000 GHz
Marker 3 [T1]
-15.57 dBm
2.404056000 GHz
D1 -15.7 dBm
D2 -35.7 dBm
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Center 2.404056 GHz
100 kHz/
Span 1 MHz

Channel Middle：



Channel High：



5. Test of Hopping Channel Separation

5.1 Applicable Standard

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.2 EUT Setup

Spectrum Analyzer

5.3 Test Equipment List and Details

See section 2.4.

5.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.

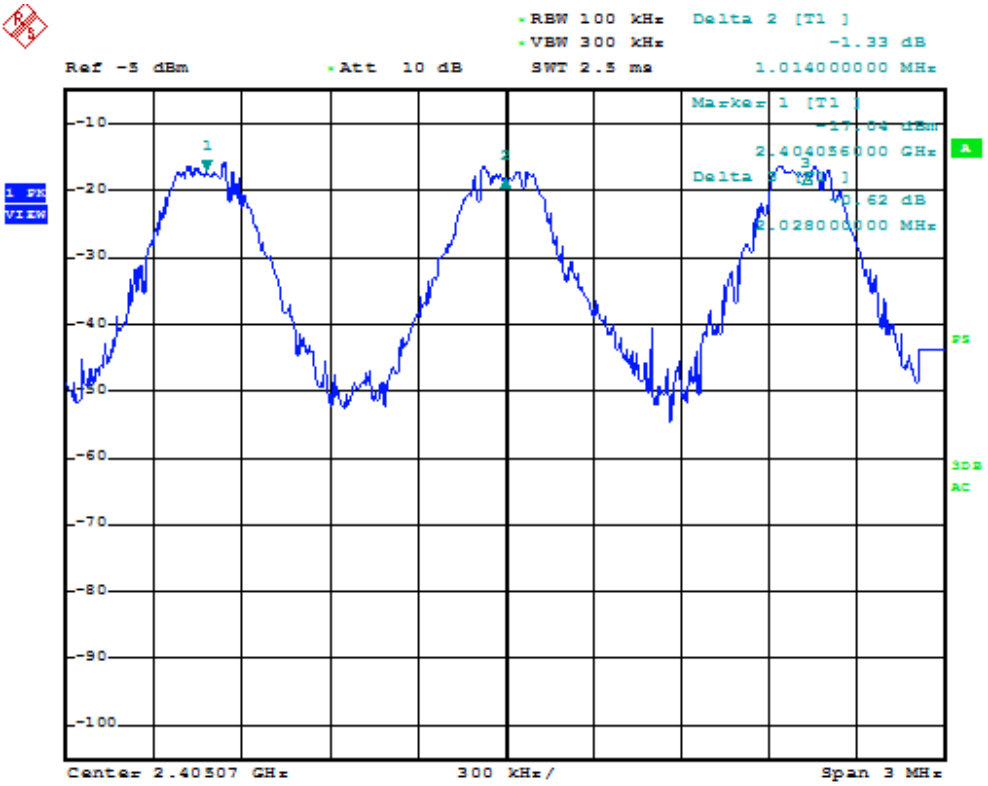
4. The Hopping Channel Separation is defined as the separation between 2 neighboring hopping frequencies.

5. Repeat above 1~3 points for the middle and highest channel of the EUT.

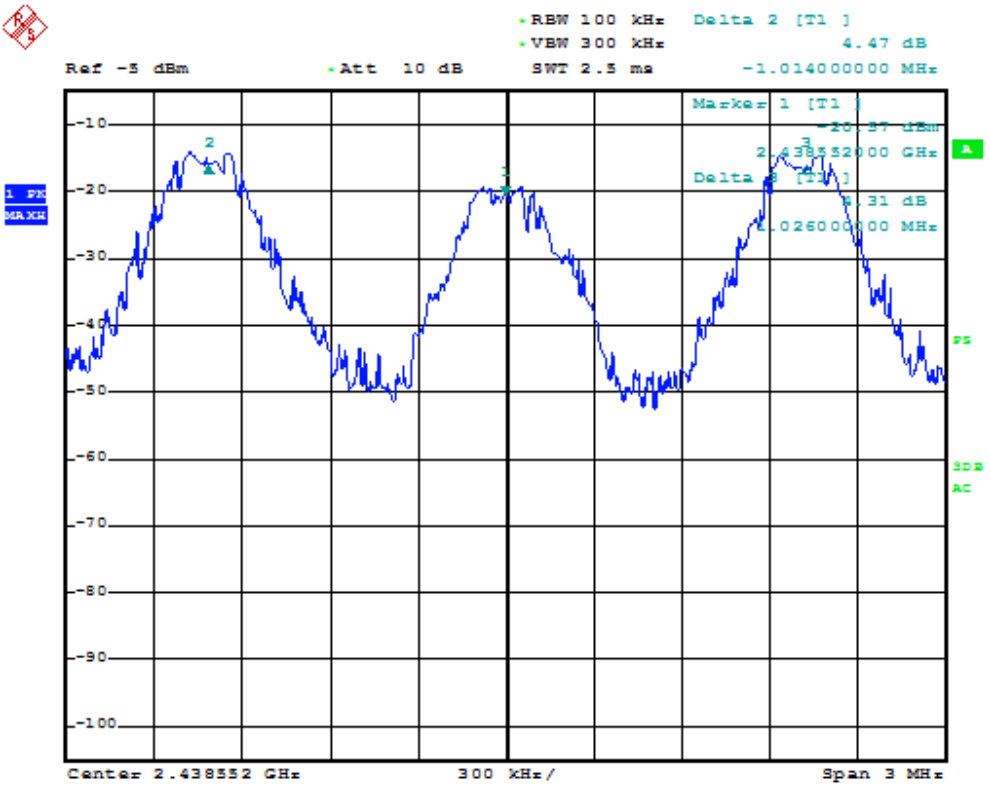
5.5 Test Result

Temperature (℃) : 22~23	EUT: ComputerSystem Graupner HoTT
Humidity (%RH): 50~54	M/N: mc-32
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

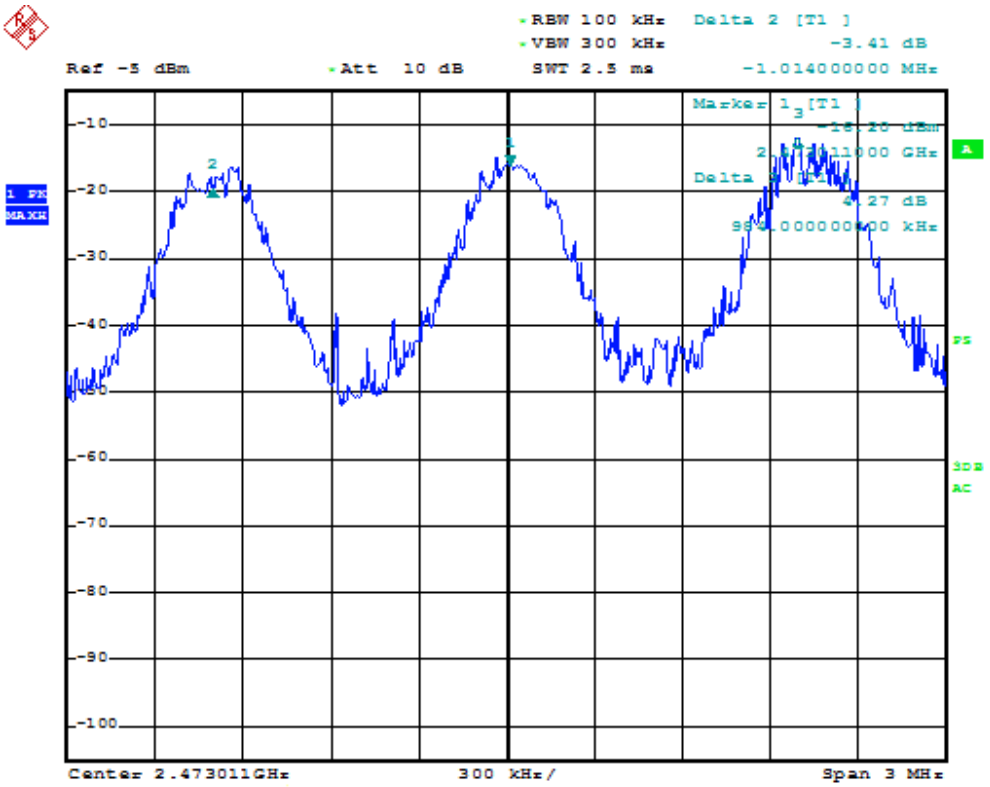
Channel Low：


RBW 100 kHz
VBW 300 kHz
Ref -5 dBm
Att 10 dB
SWT 2.5 ms
Delta 2 [T1]
-1.33 dB
1.014000000 MHz
Marker 1 [T1]
-17.04 dBm
2.404056000 GHz
Delta 3 [T1]
0.62 dB
1.028000000 MHz
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 2.40507 GHz
300 kHz/
Span 3 MHz

Channel Middle：



Channel High：



6. Test of Number of Hopping Frequency

6.1 Applicable Standard

Section 15.247(a)(1)(iii): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 15 non-overlapping hopping channels. Frequency hopping system which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping system may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels are used.

6.2 EUT Setup

Spectrum Analyzer

6.3 Test Equipment List and Details

See section 2.4.

6.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is Auto.

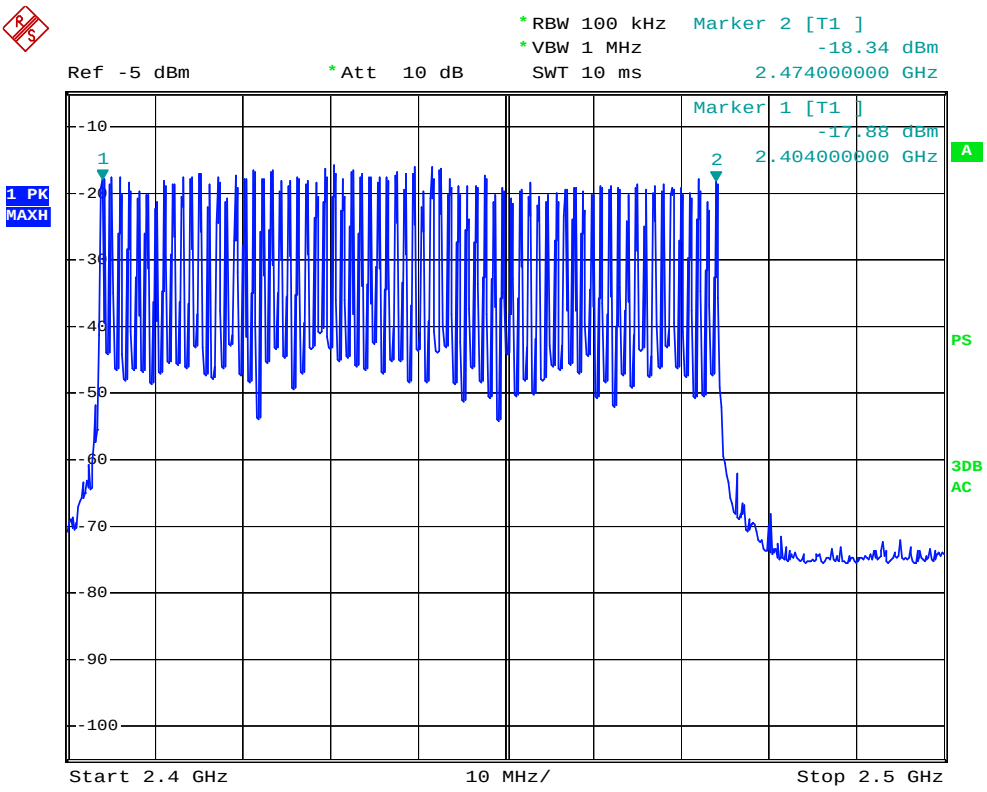
4. Observe frequency hopping in 2400MHz~2483.5MHz, there are at least 32 non-overlapping channels.

5. Repeat above 1~3 points for the middle and highest channel of the EUT.

6.5 Test Result

Temperature (℃) : 22~23	EUT: ComputerSystem Graupner HoTT
Humidity (%RH): 50~54	M/N: mc-32
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

Modulation Type	Frequency (MHz)	Number of Hopping Channels	Min. Limit (kHz)
FHSS	2404.056~2474.025	70	>15


*RBW 100 kHz
*VBW 1 MHz
Ref -5 dBm
*Att 10 dB
SWT 10 ms
Marker 2 [T1]
-18.34 dBm
2.474000000 GHz
Marker 1 [T1]
-17.88 dBm
2.404000000 GHz
1 PK
MAXH
A
PS
3DB
AC
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 2.4 GHz
10 MHz/
Stop 2.5 GHz

7. Test of Dwell Time of Each Frequency

7.1 Applicable Standard

Section 15.247(a)(1)(iii): For frequency hopping systems operating in the 2400-2483.5 MHz band The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4seconds multiplied by the number of hopping channels employed.

7.2 EUT Setup

Spectrum Analyzer

7.3 Test Equipment List and Details

See section 2.4.

7.4 Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator.

2. Set RBW of spectrum analyzer to 1000kHz and VBW to 1000kHz.

3. Set Detector to Peak, Trace to Max Hold and Sweep Time is more than once pulse time.

4. Set the center frequency on any frequency would be measure and set the frequency span to zero span.

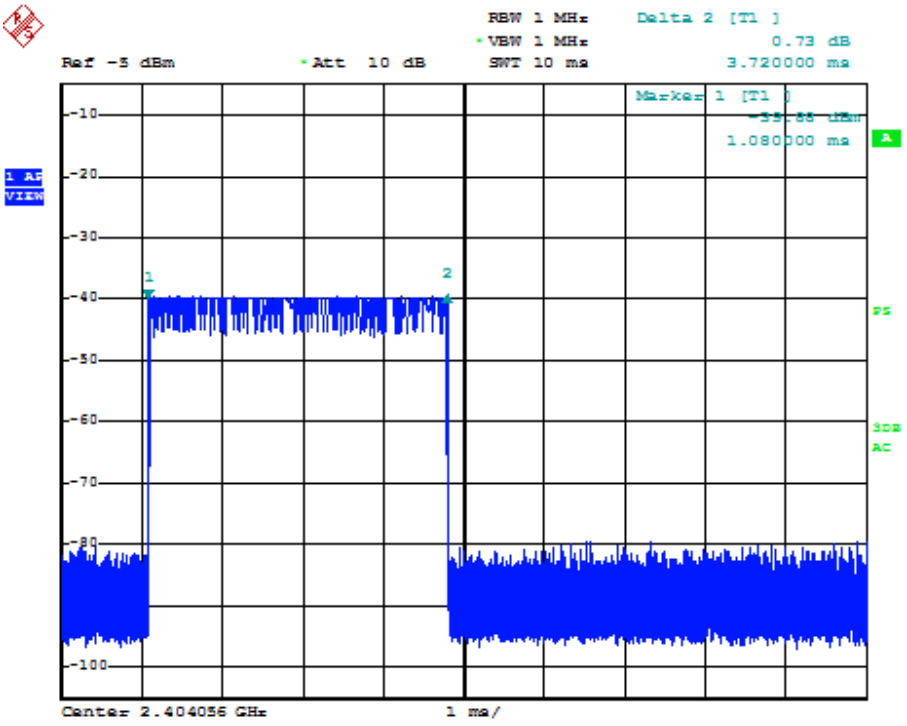
5. Measure the maximum time duration of one single pulse.

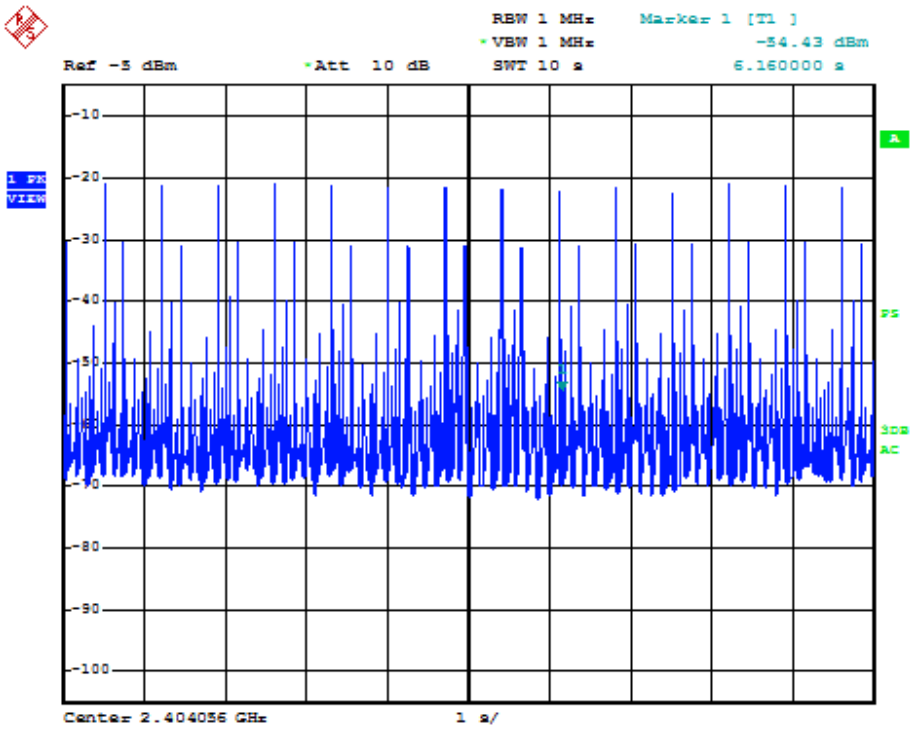
7.5 Test Result

Temperature (℃) : 22~23	EUT: ComputerSystem Graupner HoTT
Humidity (%RH): 50~54	M/N: mc-32
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

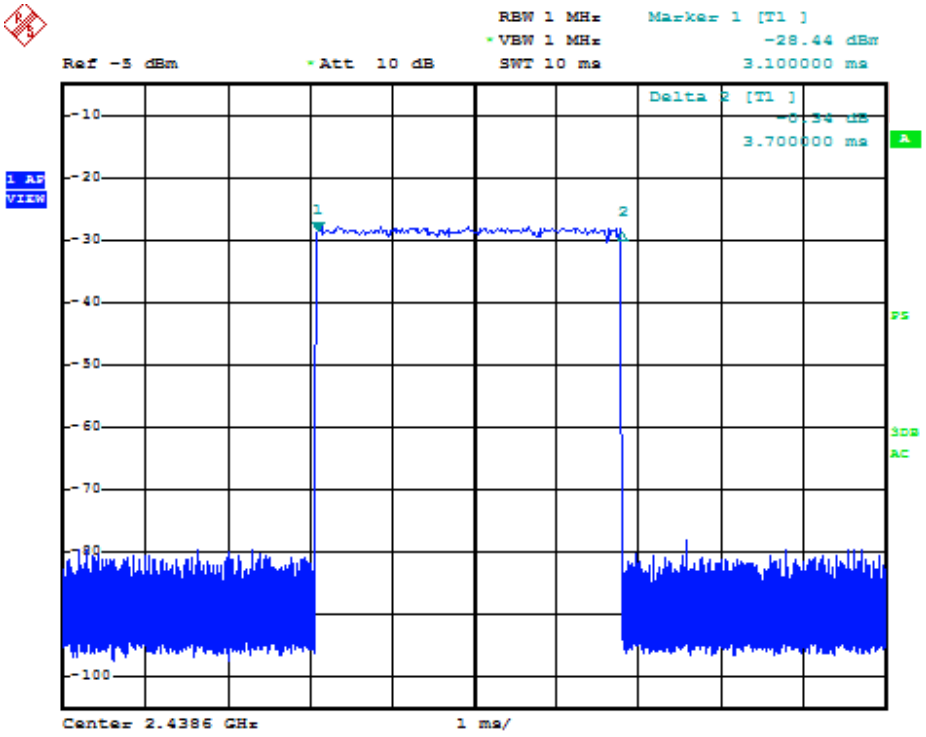
Channel No.	Frequency (MHz)	Pulse Wide （ms）	Number of Hopping Pulses in 0.4*channel number	Dwell Time (ms)	Limit (ms)
Low	2404.056	3.72	0.4*70*28/10	291.648	400
Middle	2438.600	3.70	0.4*70*28/10	290.080	400
High	2474.025	3.72	0.4*70*28/10	291.648	400

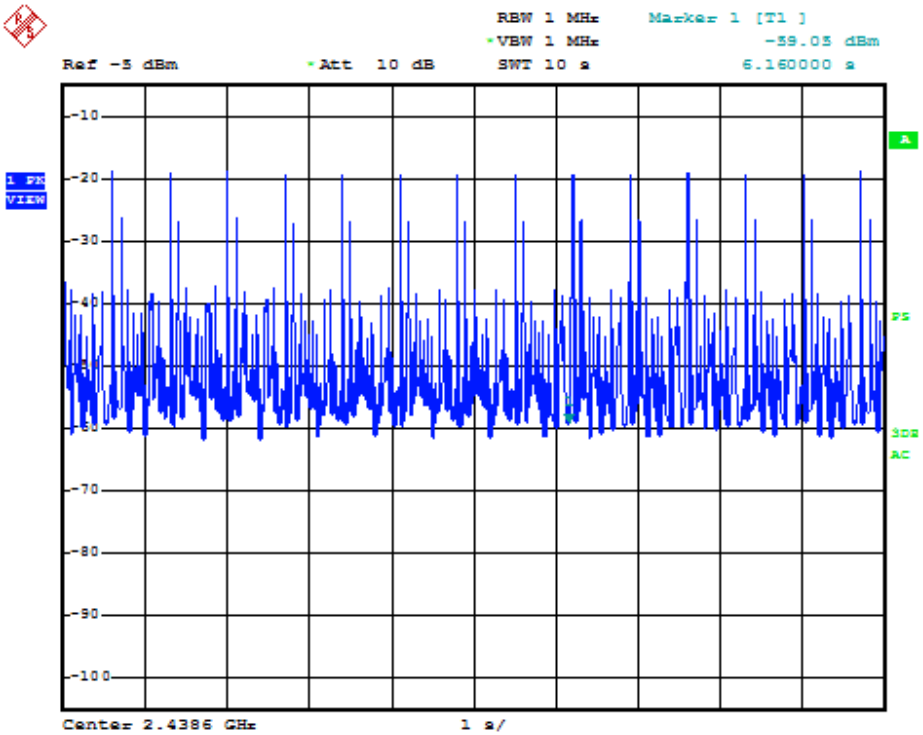
Channel Low：


RBW 1 MHz
VBW 1 MHz
SWT 10 ms
Delta 2 [T1]
0.73 dB
3.720000 ms
Ref -5 dBm
Att 10 dB
Marker 1 [T1]
-55.88 dBm
1.080000 ms
1 AP
VIEW
-10
-20
-30
-40
-50
-60
-70
-80
-100
1
2
A
PS
3DB
AC
Center 2.404056 GHz
1 ms/

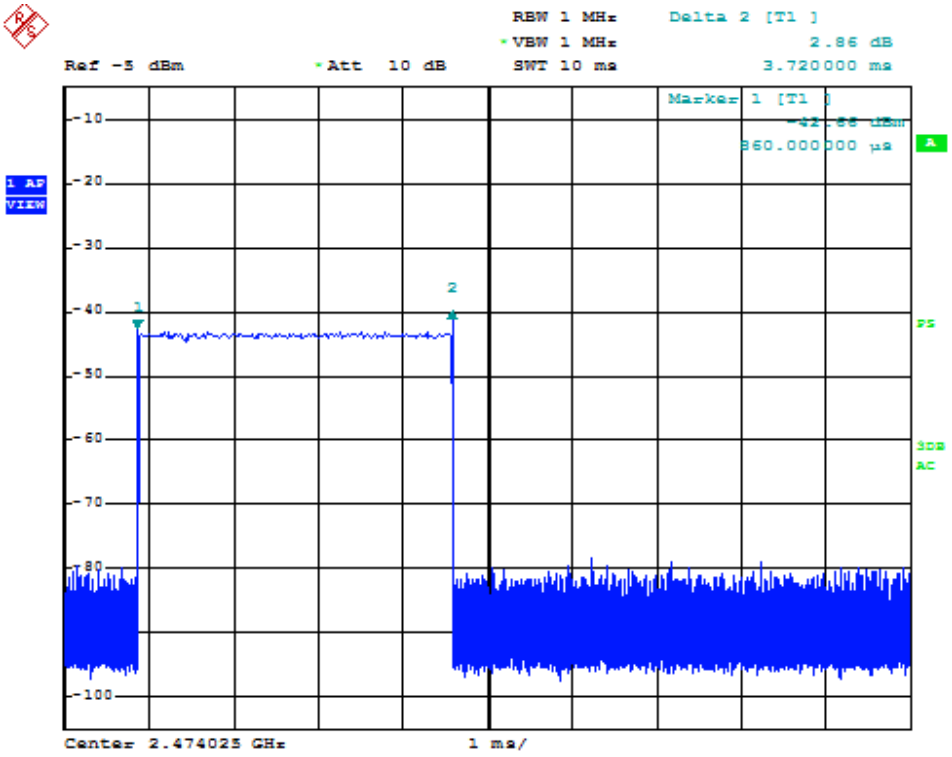

RBW 1 MHz
VBW 1 MHz
SWT 10 s
Marker 1 [T1]
-54.43 dBm
6.160000 s
Ref -5 dBm
Att 10 dB
1 PK
VIEW
-10
-20
-30
-40
-50
-70
-80
-90
-100
A
PS
3DB
AC
Center 2.404056 GHz
1 s/

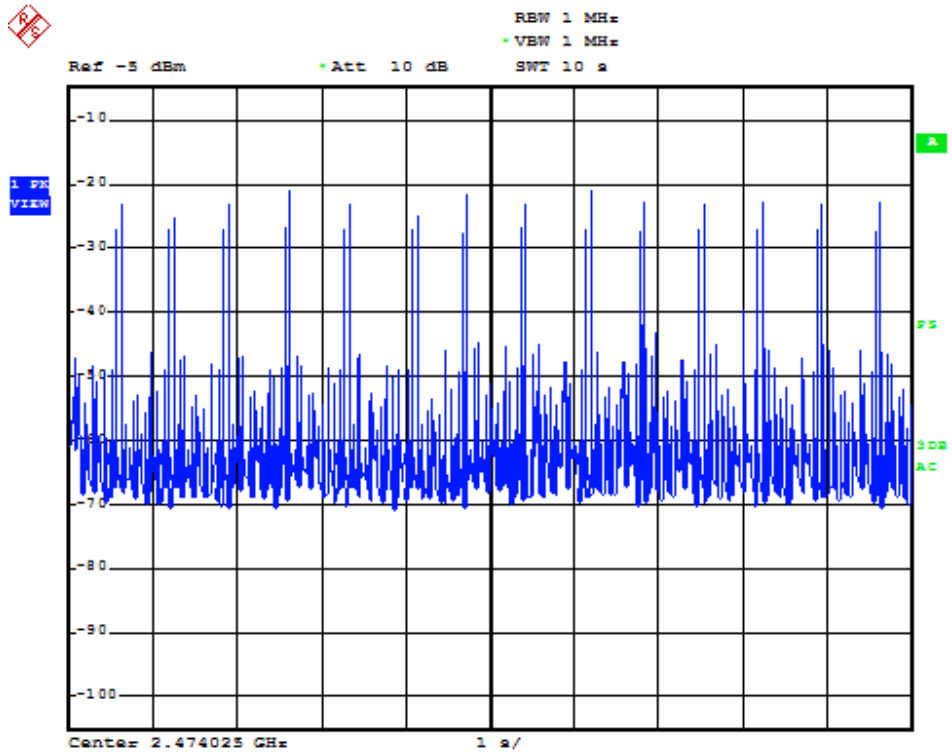
Channel Middle：





Channel High：





8. Test of Maximum Peak Output Power

8.1 Applicable Standard

Section 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels and The maximum peak output power shall not exceed 1 watt. For all other frequency hopping systems in this frequency band, The maximum peak output power shall not exceed 0.125 watt.

8.2 EUT Setup

Spectrum Analyzer

8.3 Test Equipment List and Details

See section 2.4.

8.4 Test Procedure

1. The transmitter output was connected to the peak power meter and recorded the peak value.

2. Peak power meter parameter set to auto attenuator and filter is the same as.

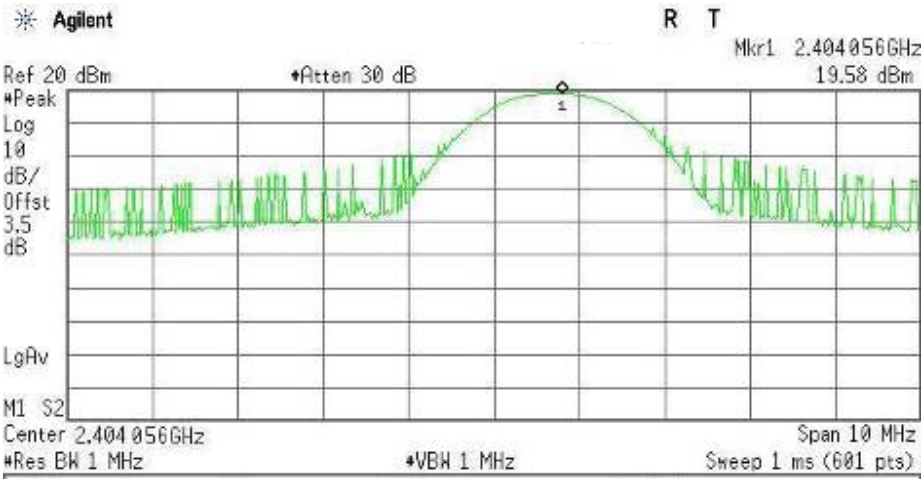
3. Repeated the 1 for the middle and highest channel of the EUT.

8.5 Test Result

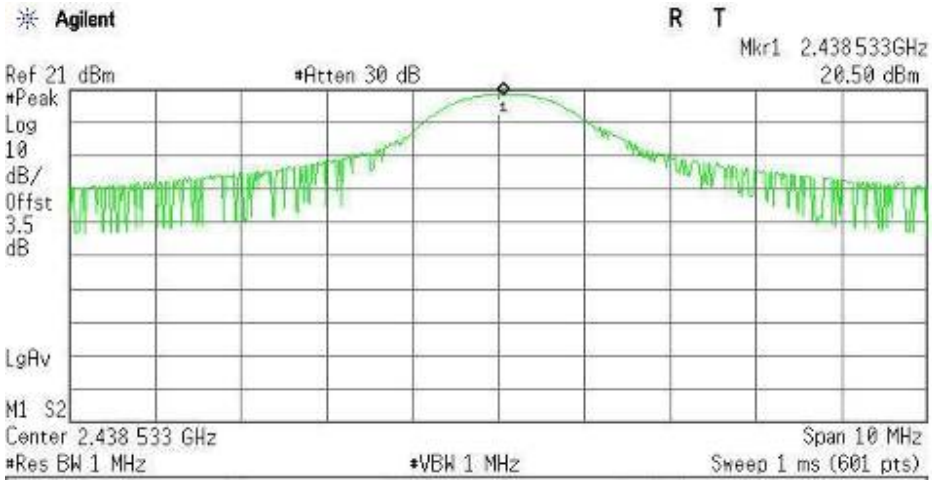
Temperature (℃) : 22~23	EUT: ComputerSystem Graupner HoTT
Humidity (%RH): 50~54	M/N: mc-32
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

Modulation Type	Channel No.	Frequency (MHz)	Output Power (dBm)	Limits (dBm)	Margin (dB)
FHSS	Low	2404.056	19.58	20.9	1.32
FHSS	Middle	2438.533	20.50	20.9	0.40
FHSS	High	2474.025	19.52	20.9	1.38

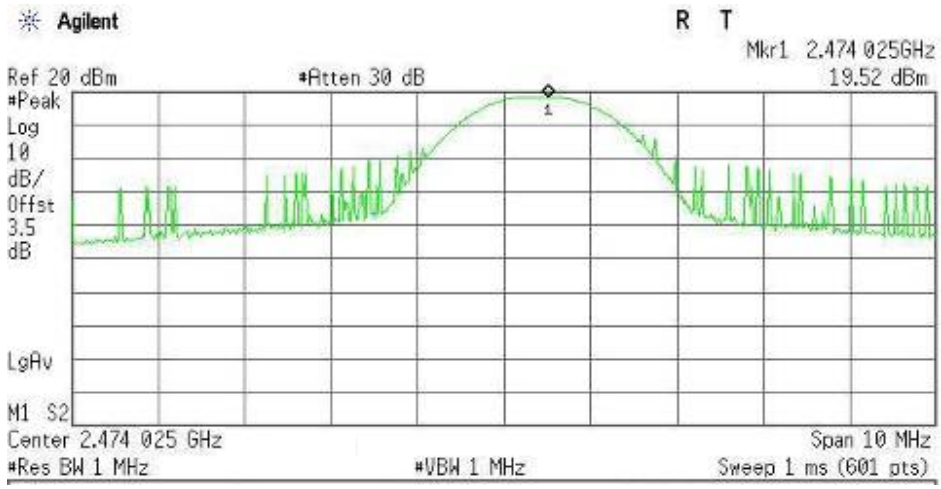
Channel Low：



Channel Middle：



Channel High：



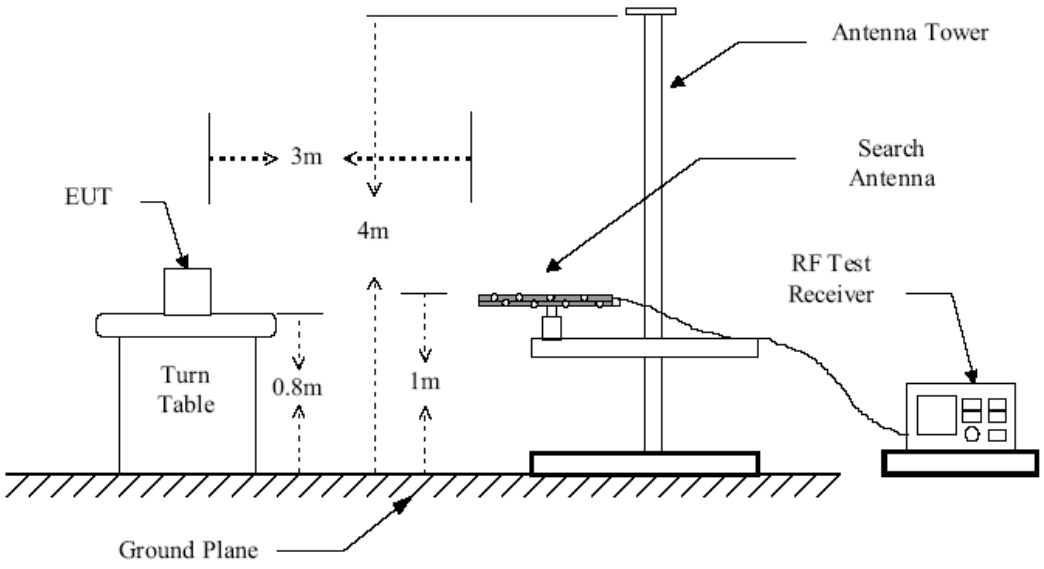
9. Test of Band Edges Emission

9.1 Applicable Standard

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

9.2 EUT Setup

Radiated Measurement Setup



Conducted Measurement Setup

Spectrum Analyzer

9.3 Test Equipment List and Details

See section 2.4.

9.4 Test Procedure

Conducted Measurement

1. The transmitter is set to the lowest channel.

2. The transmitter output was connected to the spectrum analyzer via a cable and cable loss is used as the offset of the spectrum analyzer.

3. Set both RBW and VBW of spectrum analyzer to 100KHz with convenient frequency span including 100MHz bandwidth from lower band edge. Then detector set to peak and max hold this trace.

4. The lowest band edges emission was measured and recorded.

5. The transmitter set to the highest channel and repeated 2~4.

Radiated Measurement

1. Configure the EUT according to ANSI C63.4-2009

2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.

4. For band edge emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.

5. For band edge emission, use 1MHz VBW and 1MHz RBW for reading under AV and use 1MHz VBW and 1MHz RBW for reading under PK.

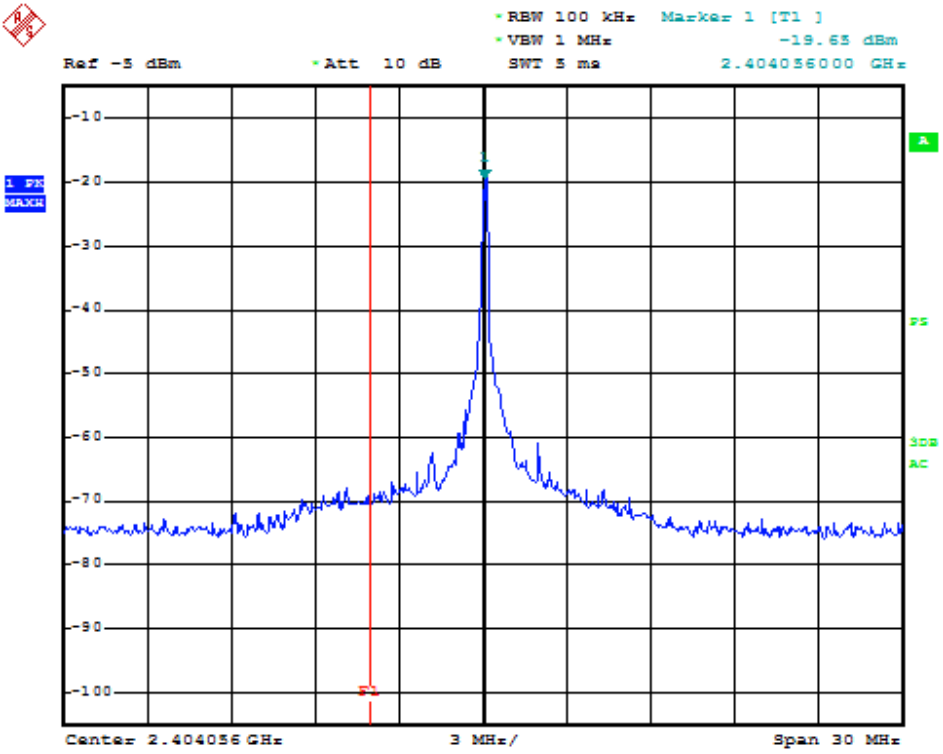
9.5 Test Result

Temperature (℃) : 22~23	EUT: ComputerSystem Graupner HoTT
Humidity (%RH): 50~54	M/N: mc-32
Barometric Pressure (mbar): 950~1000	Operation Condition: Tx Mode

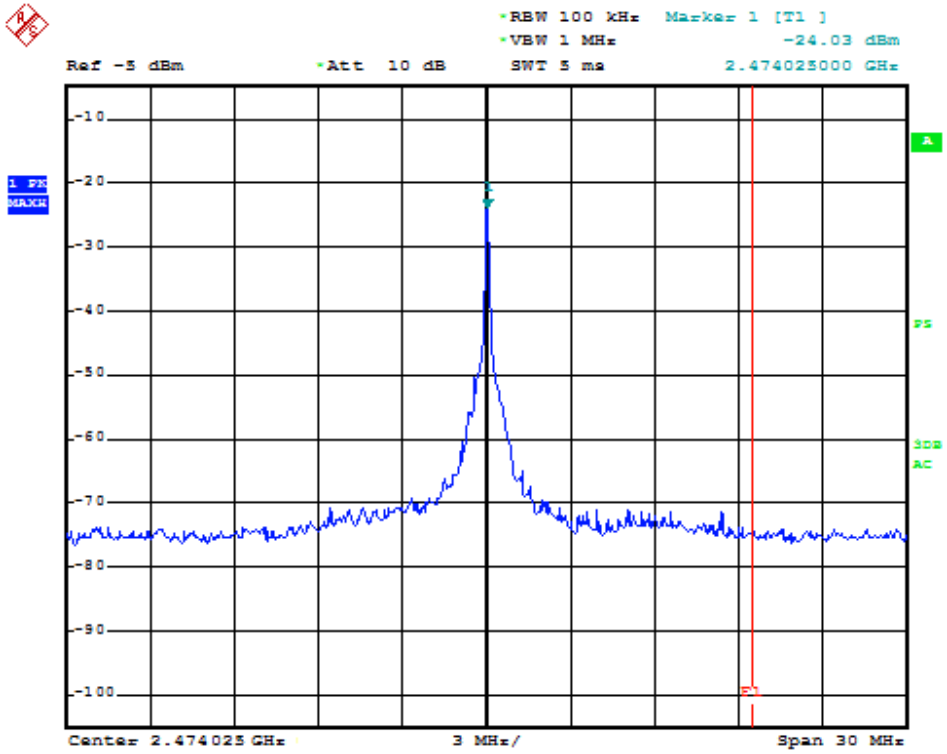
Radiated Test Result

Frequency(MHz)
<2400
>2483.5

The worst frequency range of Low Channel



The worst frequency range of High Channel



10. Test of Spurious Radiated Emission

10.1 Applicable Standard

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions that fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209.

10.2 EUT Setup

Radiated Measurement Setup

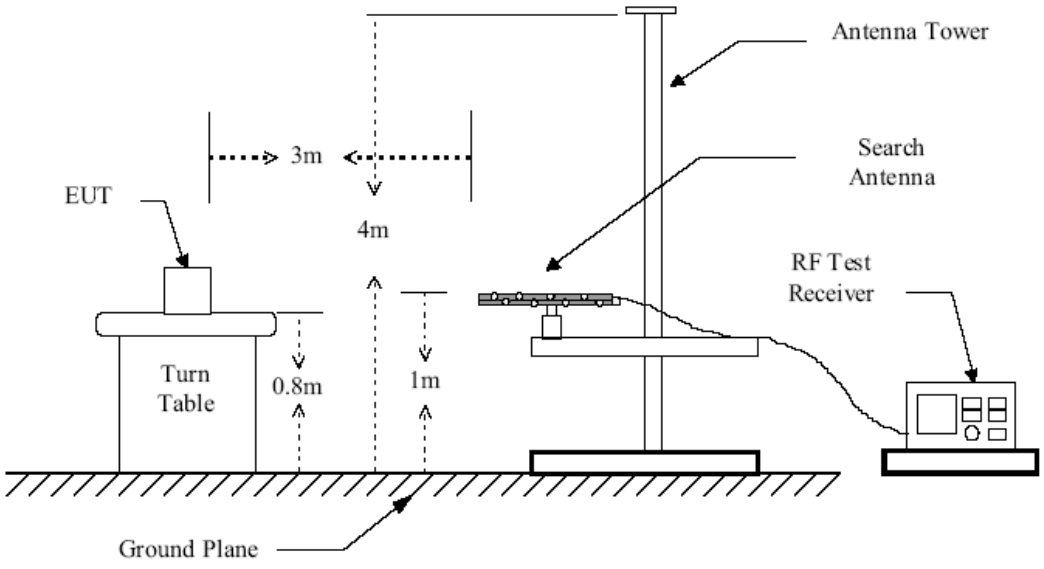


Figure 1 : Frequencies measured below 1 GHz configuration

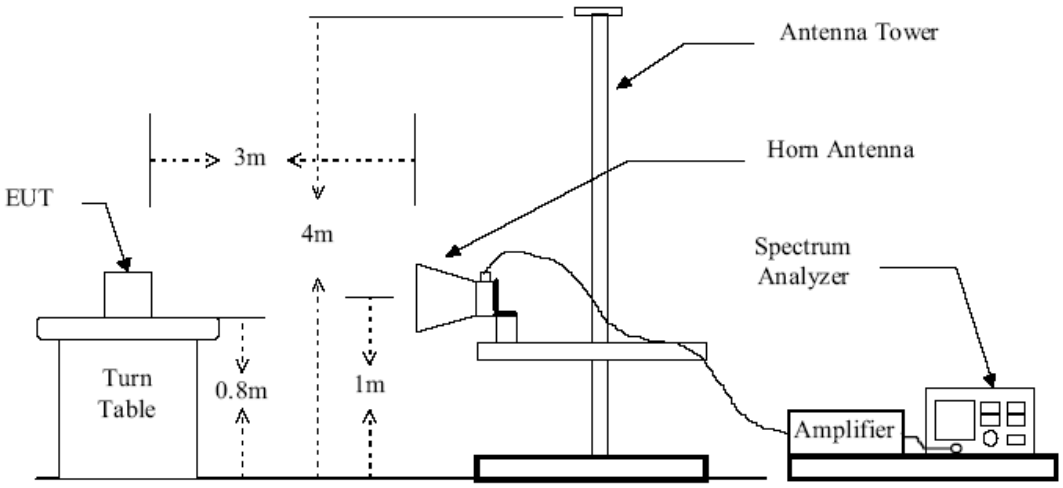


Figure 2 : Frequencies measured above 1 GHz configuration

Conducted Measurement Setup

Spectrum Analyzer

10.3 Test Equipment List and Details

See section 2.4.

10.4 Test Procedure

Radiated Measurement

1. Configure the EUT according to ANSI C63.4-2009

2. The EUT was placed on the top of the turntable 0.8 meter above ground.

3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.

4. Power on the EUT and all the supporting units.

5. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.

7. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

8. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

Conducted Measurement

1. For emission above 1GHz,conducted measurement method is used.

2. The transmitter is set to the lowest channel.

3. The transmitter output was connected to the spectrum analyzer via a cable and cable loss is used as the offset of the spectrum analyzer.

4. Set RBW to 1 MHz and VBW to 3 MHz, Then detector set to peak and max hold this trace.

5. The lowest band edges emission was measured and recorded.

6. The transmitter set to the highest channel and repeated 2~4.

10.5 Test Result

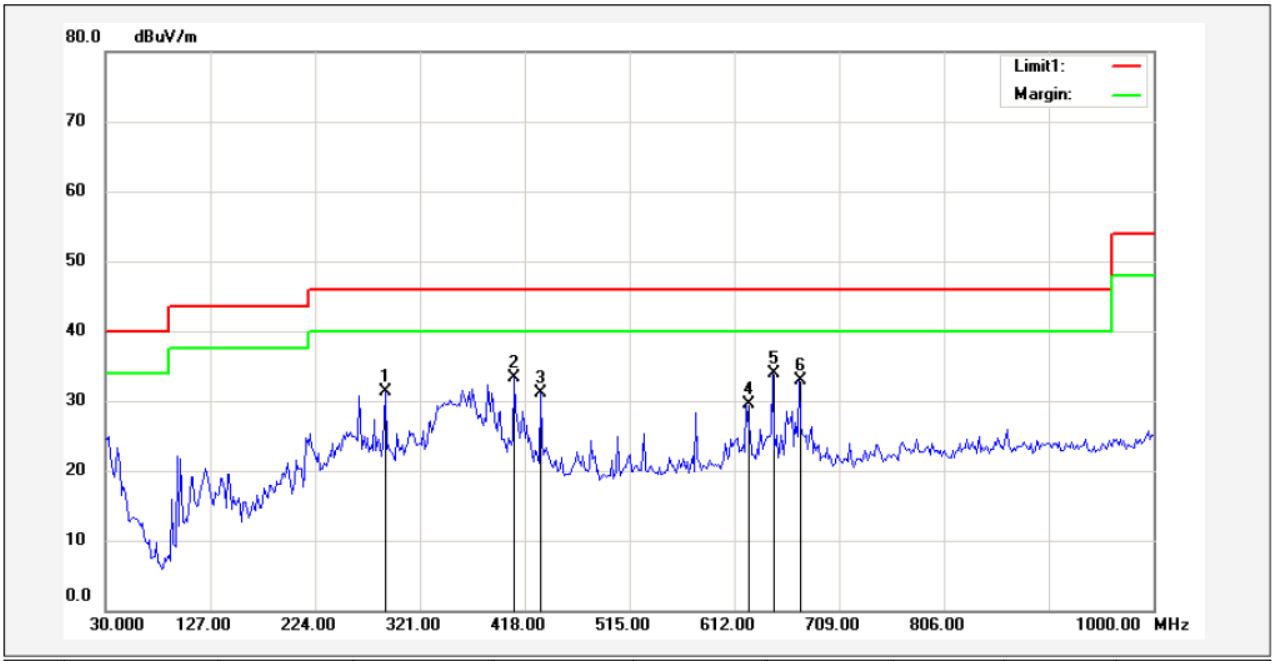
Temperature (℃) : 22~23	EUT: ComputerSystem Graupner HoTT
Humidity (%RH): 50~54	M/N: mc-32
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal operation

Note:

The below test data just show the worst mode test data,other modes test data have large margin and more than 10dB in any frequency of (30~1000MHz and above 10GHz).

The worst Spurious Emission (30~1000MHz) Of Horizontal

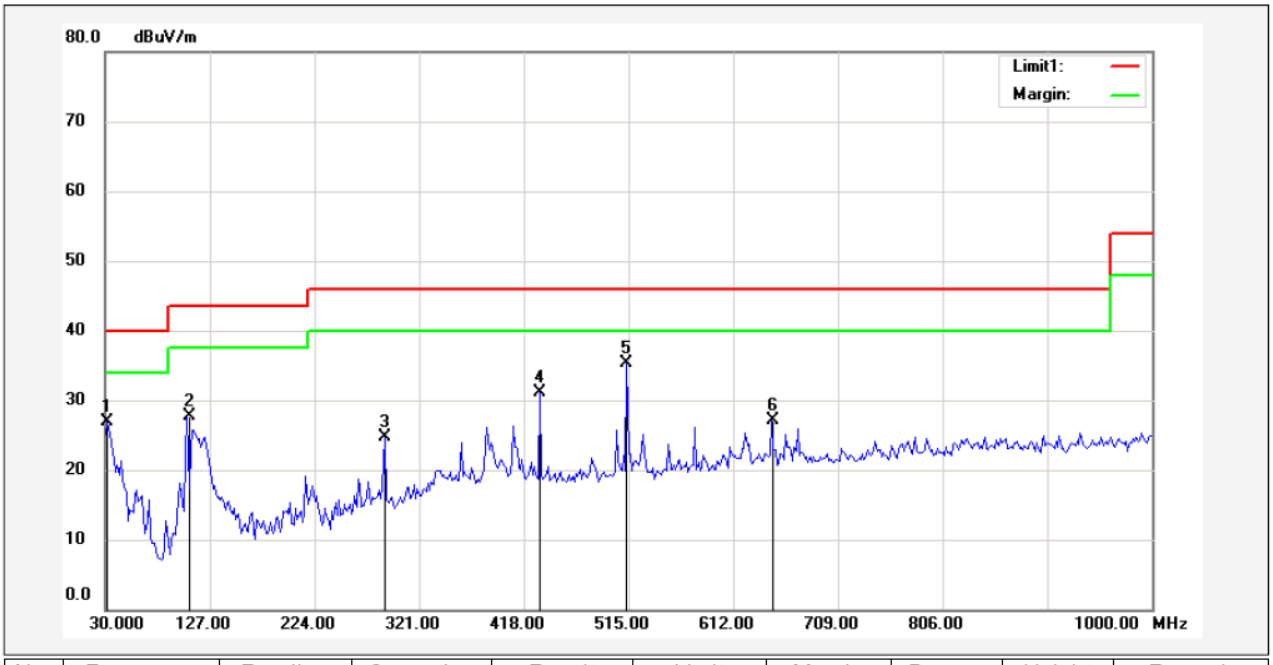
EUT:	ComputerSystem Graupner HoTT
M/N:	mc-32
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Owen Li
Test Specification:	DC 4.2V
Comment:	Polarization: Horizontal
	Tem:23℃ Hum:50%



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	288.6666	50.81	-19.45	31.36	46.00	-14.64	---	---	peak
2	408.3000	48.60	-15.38	33.22	46.00	-12.78	---	---	peak
3	432.5500	46.21	-15.07	31.14	46.00	-14.86	---	---	peak
4	623.3167	41.64	-12.16	29.48	46.00	-16.52	---	---	peak
5*	647.5667	46.01	-12.07	33.94	46.00	-12.06	---	---	peak
6	671.8167	44.79	-11.96	32.83	46.00	-13.17	---	---	peak

The worst Spurious Emission (30~1000MHz) Of Vertical

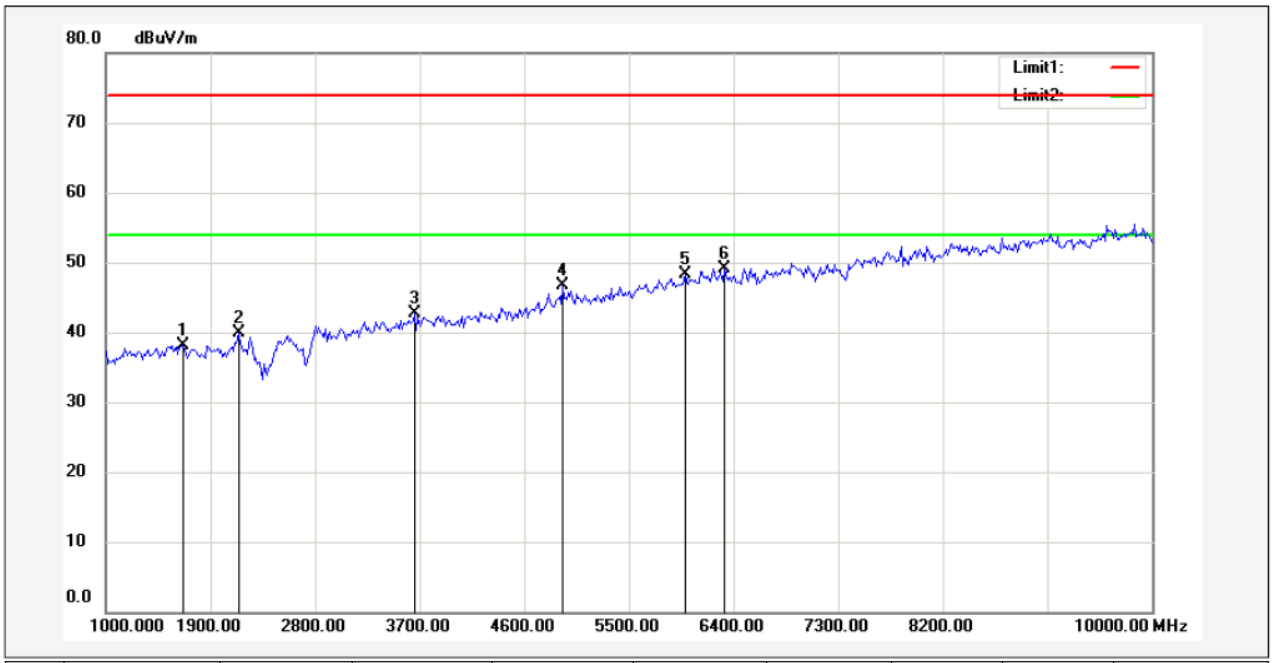
EUT:	ComputerSystem Graupner HoTT
M/N:	mc-32
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Owen Li
Test Specification:	DC 4.2V
Comment:	Polarization: Vertical
	Tem:23℃ Hum:50%



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	31.6167	39.16	-12.20	26.96	40.00	-13.04	---	---	peak
2	105.9833	49.54	-21.79	27.75	43.50	-15.75	---	---	peak
3	288.6666	44.10	-19.45	24.65	46.00	-21.35	---	---	peak
4	432.5500	46.22	-15.07	31.15	46.00	-14.85	---	---	peak
5*	513.3832	48.62	-13.40	35.22	46.00	-10.78	---	---	peak
6	647.5667	39.15	-12.07	27.08	46.00	-18.92	---	---	peak

Channel Low The Spurious Emissions Data Above 1GHz Of Horizontal

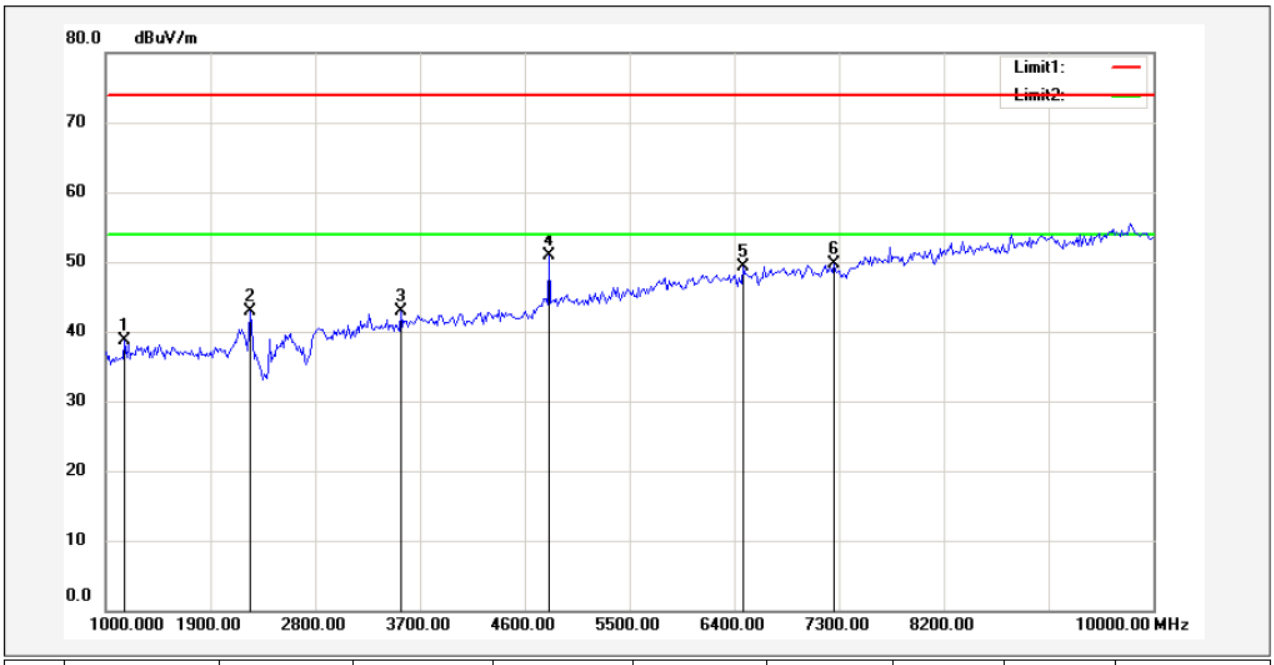
EUT:	ComputerSystem Graupner HoTT
M/N:	mc-32
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Owen Li
Test Specification:	DC 4.2V
Comment:	Polarization: Horizontal
	Tem:23℃ Hum:50%



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	1660.0000	48.36	-10.26	38.10	74.00	-35.90	---	---	peak
2	2140.0000	49.13	-9.32	39.81	74.00	-34.19	---	---	peak
3	3655.0000	46.47	-3.82	42.65	74.00	-31.35	---	---	peak
4	4930.0000	46.95	-0.23	46.72	74.00	-27.28	---	---	peak
5	5980.0000	45.33	2.90	48.23	74.00	-25.77	---	---	peak
6*	6325.0000	45.41	3.73	49.14	74.00	-24.86	---	---	peak

Channel Low The Spurious Emissions Data Above 1GHz Of Vertical

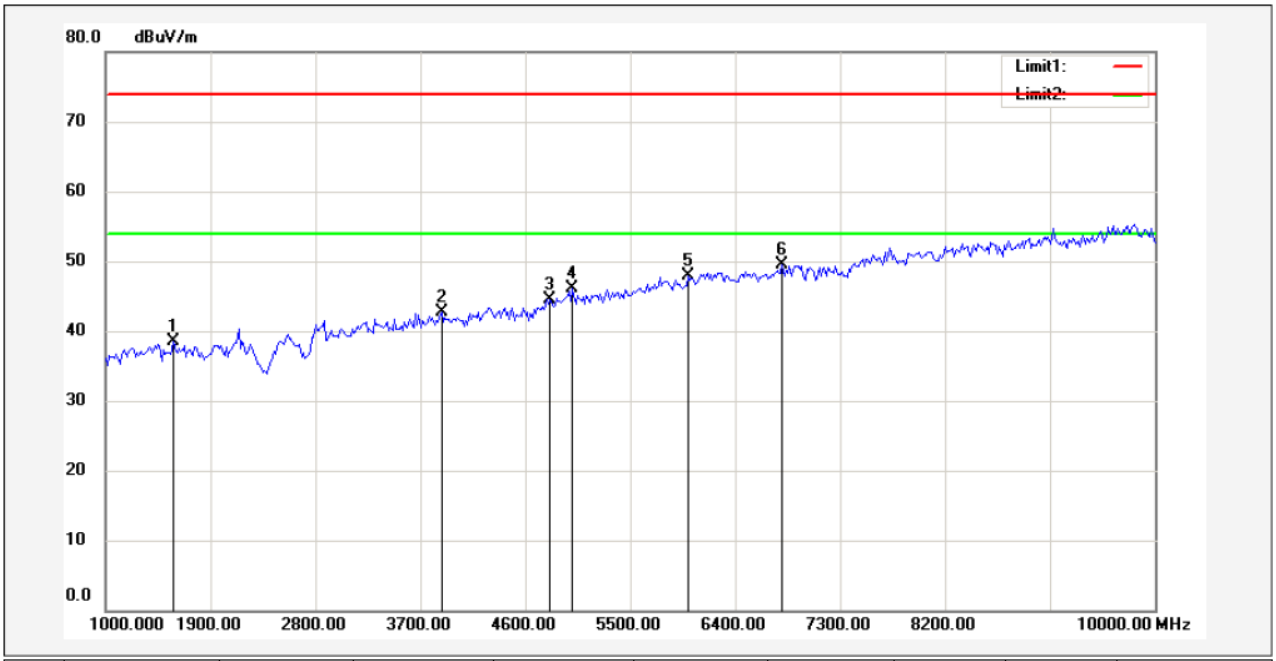
EUT:	ComputerSystem Graupner HoTT
M/N:	mc-32
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Owen Li
Test Specification:	DC 4.2V
Comment:	Polarization: Vertical
	Tem:23℃ Hum:50%



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	1165.0000	50.22	-11.51	38.71	74.00	-35.29	---	---	peak
2	2245.0000	52.46	-9.51	42.95	74.00	-31.05	---	---	peak
3	3535.0000	47.07	-4.21	42.86	74.00	-31.14	---	---	peak
4*	4810.0000	51.49	-0.62	50.87	74.00	-23.13	---	---	peak
5	6475.0000	45.47	3.87	49.34	74.00	-24.66	---	---	peak
6	7255.0000	44.67	5.11	49.78	74.00	-24.22	---	---	peak

Channel Middle The Spurious Emissions Data Above 1GHz Of Horizontal

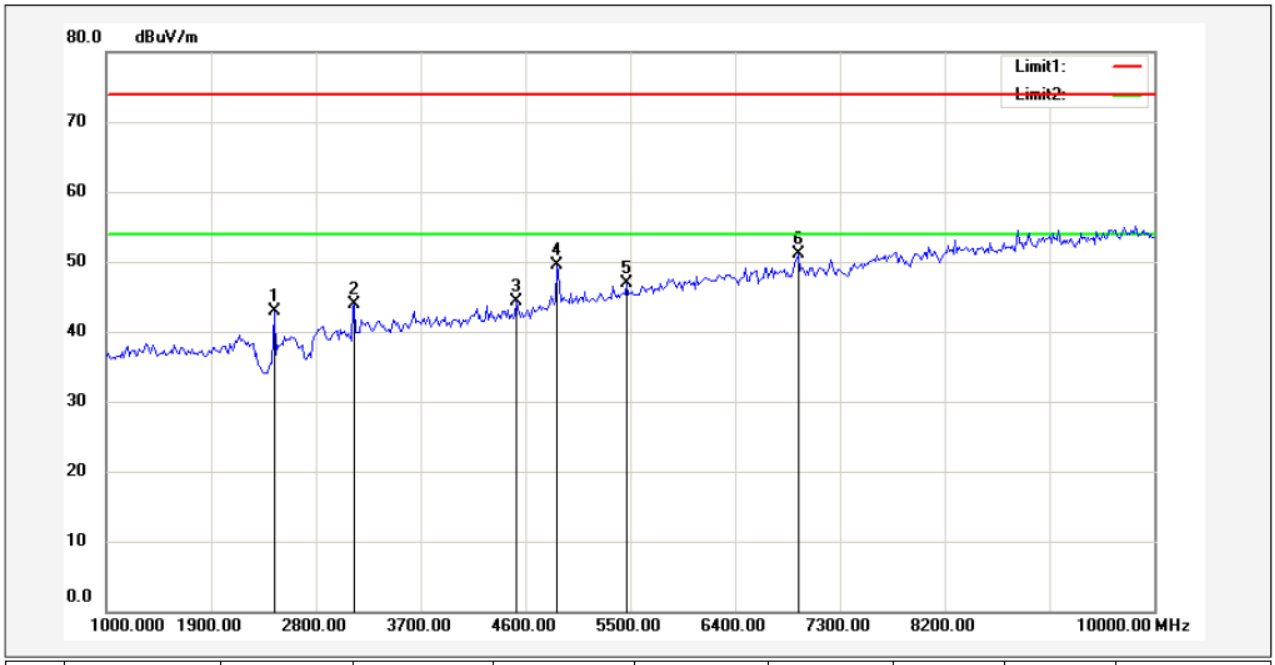
EUT:	ComputerSystem Graupner HoTT
M/N:	mc-32
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Owen Li
Test Specification:	DC 4.2V
Comment:	Polarization: Horizontal
	Tem:23℃ Hum:50%



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	1585.0000	48.89	-10.31	38.58	74.00	-35.42	---	---	peak
2	3880.0000	46.49	-3.76	42.73	74.00	-31.27	---	---	peak
3	4810.0000	45.17	-0.62	44.55	74.00	-29.45	---	---	peak
4	5005.0000	46.01	0.00	46.01	74.00	-27.99	---	---	peak
5	5995.0000	45.04	2.92	47.96	74.00	-26.04	---	---	peak
6*	6805.0000	45.29	4.30	49.59	74.00	-24.41	---	---	peak

Channel Middle The Spurious Emissions Data Above 1GHz Of Vertical

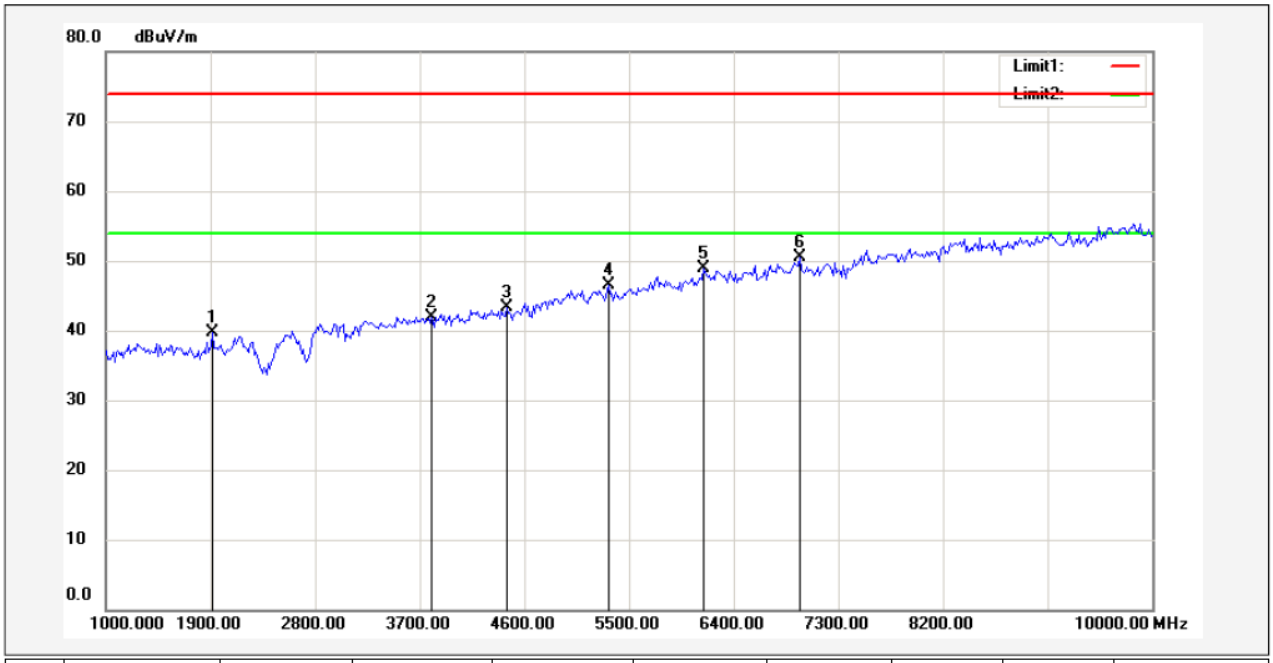
EUT:	ComputerSystem Graupner HoTT
M/N:	mc-32
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Owen Li
Test Specification:	DC 4.2V
Comment:	Polarization: Vertical
	Tem:23℃ Hum:50%



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	2440.0000	52.61	-9.75	42.86	74.00	-31.14	---	---	peak
2	3130.0000	49.49	-5.65	43.84	74.00	-30.16	---	---	peak
3	4525.0000	46.30	-1.95	44.35	74.00	-29.65	---	---	peak
4	4870.0000	49.94	-0.43	49.51	74.00	-24.49	---	---	peak
5	5470.0000	45.63	1.18	46.81	74.00	-27.19	---	---	peak
6*	6940.0000	46.70	4.37	51.07	74.00	-22.93	---	---	peak

Channel High The Spurious Emissions Data Above 1GHz Of Horizontal

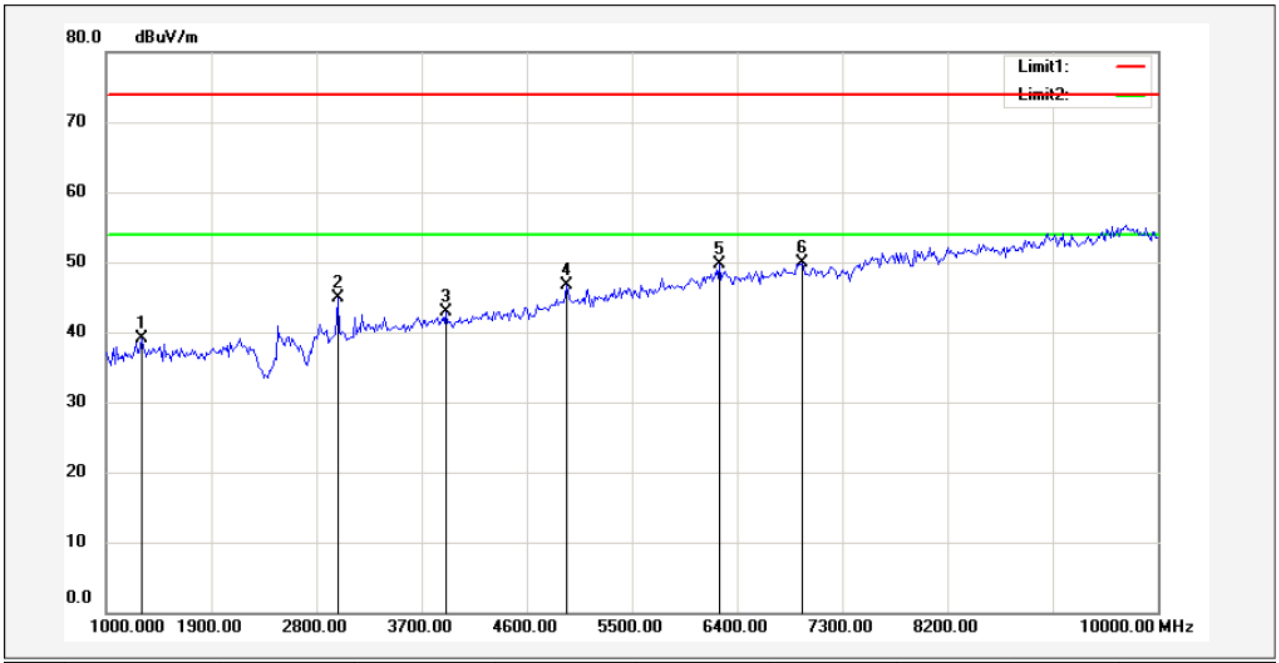
EUT:	ComputerSystem Graupner HoTT
M/N:	mc-32
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Owen Li
Test Specification:	DC 4.2V
Comment:	Polarization: Horizontal
	Tem:23℃ Hum:50%



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	1915.0000	49.30	-9.63	39.67	74.00	-34.33	---	---	peak
2	3805.0000	45.81	-3.87	41.94	74.00	-32.06	---	---	peak
3	4450.0000	45.43	-2.13	43.30	74.00	-30.70	---	---	peak
4	5320.0000	45.62	0.84	46.46	74.00	-27.54	---	---	peak
5	6145.0000	45.27	3.58	48.85	74.00	-25.15	---	---	peak
6*	6970.0000	46.18	4.39	50.57	74.00	-23.43	---	---	peak

Channel High The Spurious Emissions Data Above 1GHz Of Vertical

EUT:	ComputerSystem Graupner HoTT
M/N:	mc-32
Operating Condition:	Normal Operation
Test Site:	3m CHAMBER
Operator:	Owen Li
Test Specification:	DC 4.2V
Comment:	Polarization: Vertical
	Tem:23℃ Hum:50%



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	1300.0000	49.94	-10.89	39.05	74.00	-34.95	---	---	peak
2	2980.0000	51.04	-6.10	44.94	74.00	-29.06	---	---	peak
3	3910.0000	46.59	-3.71	42.88	74.00	-31.12	---	---	peak
4	4945.0000	46.96	-0.19	46.77	74.00	-27.23	---	---	peak
5	6250.0000	45.98	3.79	49.77	74.00	-24.23	---	---	peak
6*	6955.0000	45.53	4.38	49.91	74.00	-24.09	---	---	peak

11. ANTENNA REQUIREMENT

11.1 Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected Construction

The antenna used in this product is complied with Standdard. The maximum Gain of the antenna lower than 6.0dBi and have the definite antenna Specification.