FCC RADIO TEST REPORT-WIFI
FCC ID: 2ADUM-OPL301

Product：	OPCOM-1
Trade Name：	OPCOM Link
Model Name：	OPL301
Serial Model：	N/A
Report No.：	NTEK-2014NT0620972F

Prepared for

OPCOM O.E.(DONGGUAN) INC.

Gu Cun Industry Estate Dajing Countryside Committee Houjie Town,Dongguan City Guangdong,China

Prepared by

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TEST RESULT CERTIFICATION

Applicant's name ..... OPCOM O.E.(DONGGUAN) INC.

Address ..... Gu Cun Industry Estate Dajing Countryside Committee Houjie Town,Dongguan City Guangdong,China

Manufacture's Name... OPCOM O.E.(DONGGUAN) INC.

Address ..... Gu Cun Industry Estate Dajing Countryside Committee Houjie Town,Dongguan City Guangdong,China

Product description

Product name OPCOM-1

Model and/or type reference OPL301

Serial Model ..... N/A

Standards ..... FCC Part15.247: 01 Oct. 2014

Test procedure ..... ANSI C63.4-2003 and KDB 558074 : June 5, 2014

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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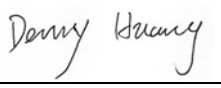
Date of Test .....

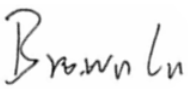
Date (s) of performance of tests ..... 01 Sep. 2014 ~07 Nov. 2014

Date of Issue..... 07 Nov. 2014

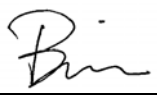
Test Result..... **Pass**

Testing Engineer : 

Denny Huang

Technical Manager : 

(Brown Lu)

Authorized Signatory : 

(Bill Yao)

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (a)(2)	6dB Bandwidth	PASS	
15.247 (b)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (d)	Power Spectral Density	PASS	
15.205	Band Edge Emission	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)” N/A” denotes test is not applicable in this Test Report

1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd
Add.:1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.
FCC Registration No.:238937; IC Registration No.:9270A-1
CNAS Registration No.:L5516

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td>OPCOM-1</td></tr>
<tr><td>Trade Name</td><td>OPCOM Link</td></tr>
<tr><td>Model Name</td><td>OPL301</td></tr>
<tr><td>Serial Model</td><td>N/A</td></tr>
<tr><td>Model Difference</td><td>N/A</td></tr>
<tr><td>Product Description</td><td>The EUT is a OPCOM-1
<table>
<tr><td>Operation Frequency:</td><td>802.11b/g/n(20MHz): 2412~2462MHz</td></tr>
<tr><td>Modulation Type:</td><td>CCK/OFDM/DBPSK</td></tr>
<tr><td>Bit Rate of Transmitter</td><td>802.11b:11/5.5/2/1 Mbps
802.11g:54/48/36/24/18/12/9/6Mbps
802.11n(20MHz):150/144.44/130/117/
115.56/104/86.67/78/52/6.5Mbps</td></tr>
<tr><td>Number Of Channel</td><td>802.11b/g/n20MHz:11CH</td></tr>
<tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr>
<tr><td>Antenna Gain (dBi)</td><td>1.8 dBi</td></tr>
</table></td></tr>
<tr><td>Channel List</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Ratings</td><td>DC 12V</td></tr>
<tr><td>Adapter</td><td>Model:DSA-18PFG-12 FUS 120125
Input: 100-240V~,50/60Hz, 0.6A
Output: 12V⎓, 1.25A</td></tr>
<tr><td>Battery</td><td>N/A</td></tr>
<tr><td>Connecting I/O Port(s)</td><td>Please refer to the User's Manual</td></tr>
</table>

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

2.

Channel List for 802.11b/g/n(20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

3.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	external antenna	N/A	1.8	Wifi Antenna

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n/20MHz CH1/ CH6/ CH11
Mode 4	Link Mode

For Conducted Emission	
Final Test Mode	Description
Mode 4	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11b CH1/ CH6/ CH11
Mode 2	802.11g CH1/ CH6/ CH11
Mode 3	802.11n/20MHz CH1/ CH6/ CH11

Note:

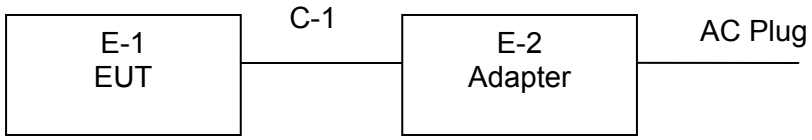
(1) The measurements are performed at the highest, middle, lowest available channels.

(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

(3) EUT configured to transmit continuously:

Operated Mode for Worst Duty Cycle	
Test Signal Duty Cycle (x)	Average correction factor (dB)
100% - IEEE 802.11b	0
100% - IEEE 802.11g	0
100% - IEEE 802.11n (HT20)	0
100% - IEEE 802.11n (HT40)	0

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	OPCOM-1	OPCOM Link	OPL301	N/A	EUT
E-2	Adapter	N/A	DSA-18PFG-12 FUS 120125	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.2m	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2014.07.06	2015.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2014.06.07	2015.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2014.07.06	2015.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2014.06.07	2015.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2014.06.07	2015.06.06	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2014.07.06	2015.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2014.07.06	2015.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2013.12.22	2014.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2014.06.08	2015.06.07	1 year
10	Power Meter	R&S	NRVS	100696	2014.07.06	2015.07.05	1 year
11	Power Sensor	R&S	URV5-Z4	0395.1619.05	2014.07.06	2015.07.05	1 year
12	Test Cable	N/A	R-01	N/A	2014.07.06	2015.07.05	1 year
13	Test Cable	N/A	R-02	N/A	2014.07.06	2015.07.05	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2014.06.06	2015.06.05	1 year
2	LISN	R&S	ENV216	101313	2014.08.24	2015.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2014.08.24	2015.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2014.06.07	2015.06.06	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2014.06.07	2015.06.06	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2014.06.08	2015.06.07	1 year
7	Test Cable	N/A	C01	N/A	2014.06.08	2015.06.07	1 year
8	Test Cable	N/A	C02	N/A	2014.06.08	2015.06.07	1 year
9	Test Cable	N/A	C03	N/A	2014.06.08	2015.06.07	1 year

1	Attenuation	MCE	24-10-34	BN9258	2014.06.08	2015.06.07	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

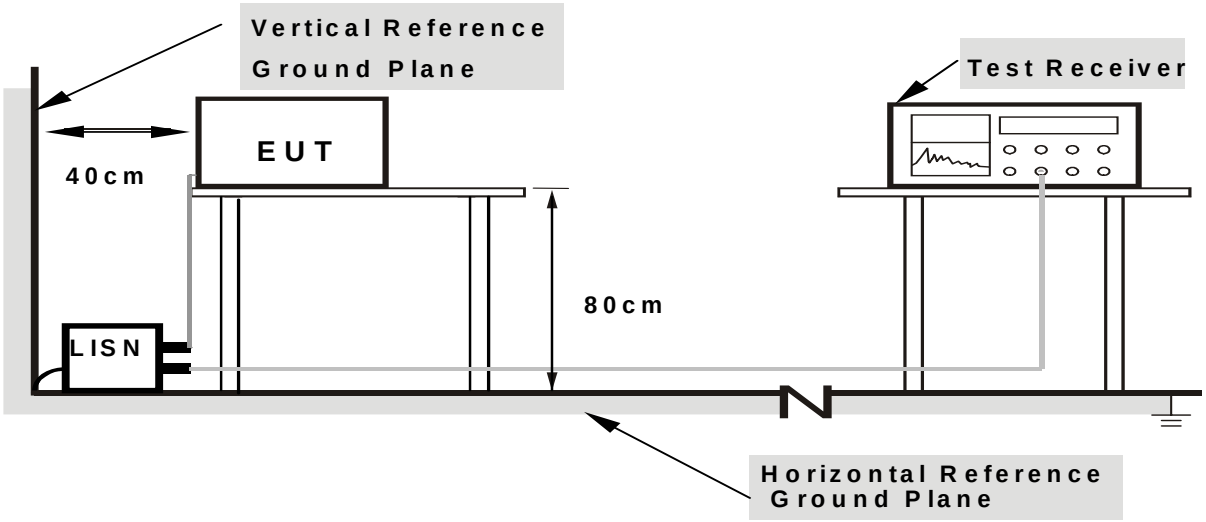
3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

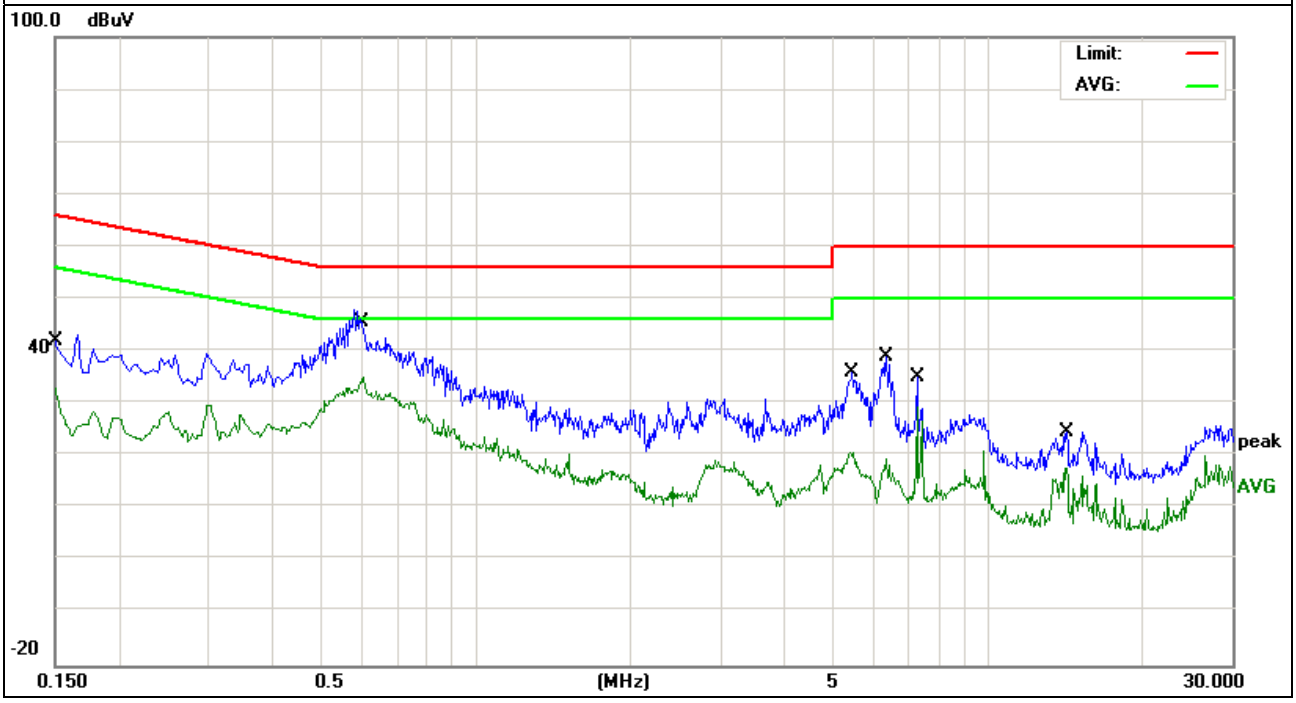
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

3.1.6 TEST RESULTS

EUT：	OPCOM-1	Model Name. ：	OPL301
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 12V form Adapter AC 120V/60Hz	Test Mode：	Mode 4

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1499	32.21	9.63	41.84	66.00	-24.16	QP
0.1499	23.23	9.63	32.86	56.00	-23.14	AVG
0.6020	38.43	9.52	47.95	56.00	-8.05	QP
0.6020	25.44	9.52	34.96	46.00	-11.04	AVG
5.4618	26.20	9.62	35.82	60.00	-24.18	QP
5.4618	11.03	9.62	20.65	50.00	-29.35	AVG
6.3299	29.44	9.65	39.09	60.00	-20.91	QP
6.3299	9.73	9.65	19.38	50.00	-30.62	AVG
7.2819	25.24	9.67	34.91	60.00	-25.09	QP
7.2819	19.76	9.67	29.43	50.00	-20.57	AVG
14.2139	14.82	9.82	24.64	60.00	-35.36	QP
14.2139	7.98	9.82	17.80	50.00	-32.20	AVG

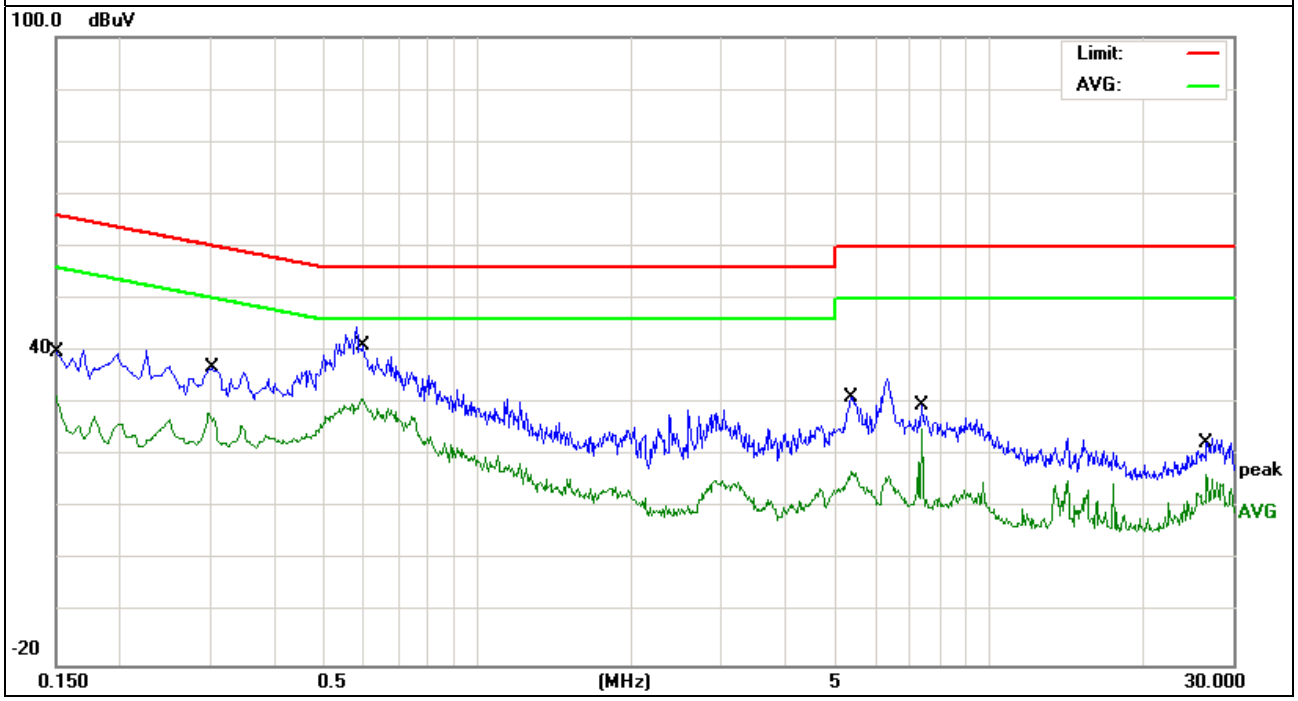
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



EUT：	OPCOM-1	Model Name. ：	OPL301
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 12V form Adapter AC 120V/60Hz	Test Mode：	Mode 4

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(MHz)	(dBμV)	(dB)	(dBμV)	(dBμV)	(dB)	
0.1499	30.13	9.66	39.79	66.00	-26.21	QP
0.1499	21.66	9.66	31.32	56.00	-24.68	AVG
0.3002	27.09	9.51	36.60	60.23	-23.63	QP
0.3002	18.76	9.51	28.27	50.23	-21.96	AVG
0.5980	31.42	9.53	40.95	56.00	-15.05	QP
0.5980	21.47	9.53	31.00	46.00	-15.00	AVG
5.3619	21.58	9.61	31.19	60.00	-28.81	QP
5.3619	7.40	9.61	17.01	50.00	-32.99	AVG
7.3859	19.98	9.68	29.66	60.00	-30.34	QP
7.3859	15.50	9.68	25.18	50.00	-24.82	AVG
26.6220	12.15	10.27	22.42	60.00	-37.58	QP
26.6220	6.30	10.27	16.57	50.00	-33.43	AVG

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / *10Hz* for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

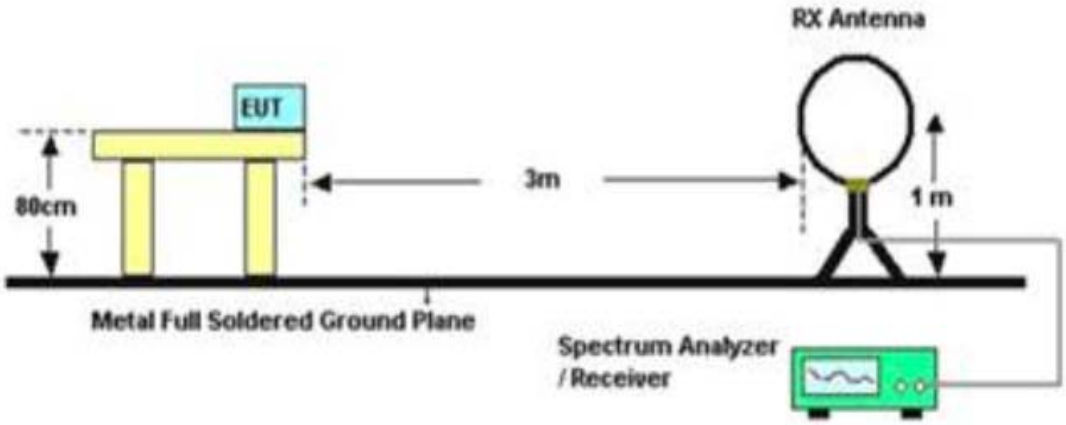
Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Peak	1 MHz	10 Hz

3.2.3 DEVIATION FROM TEST STANDARD

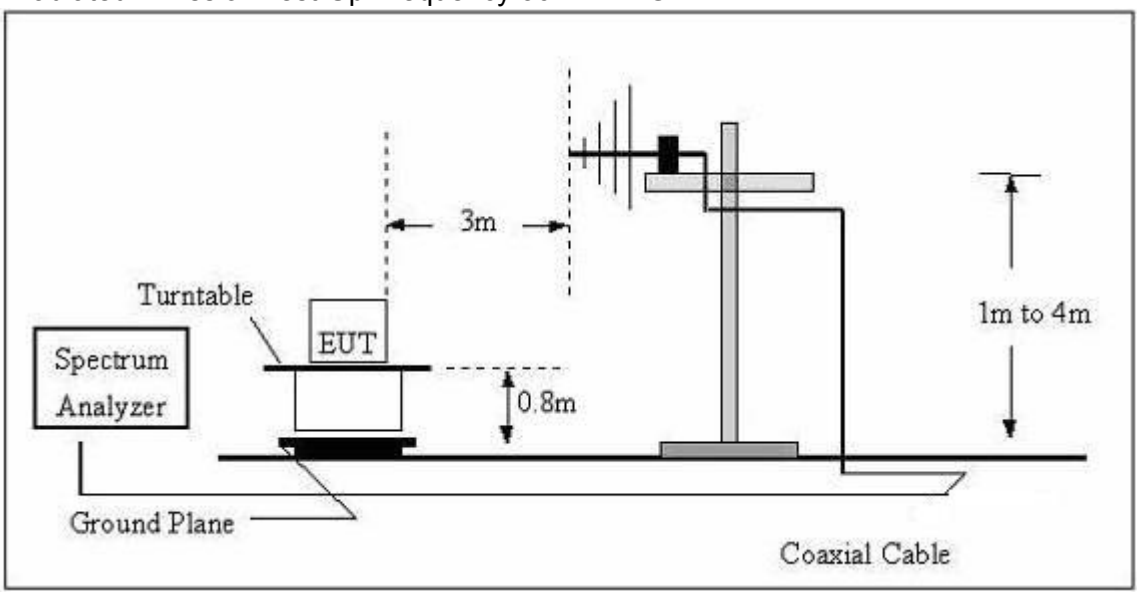
No deviation

3.2.4 TEST SETUP

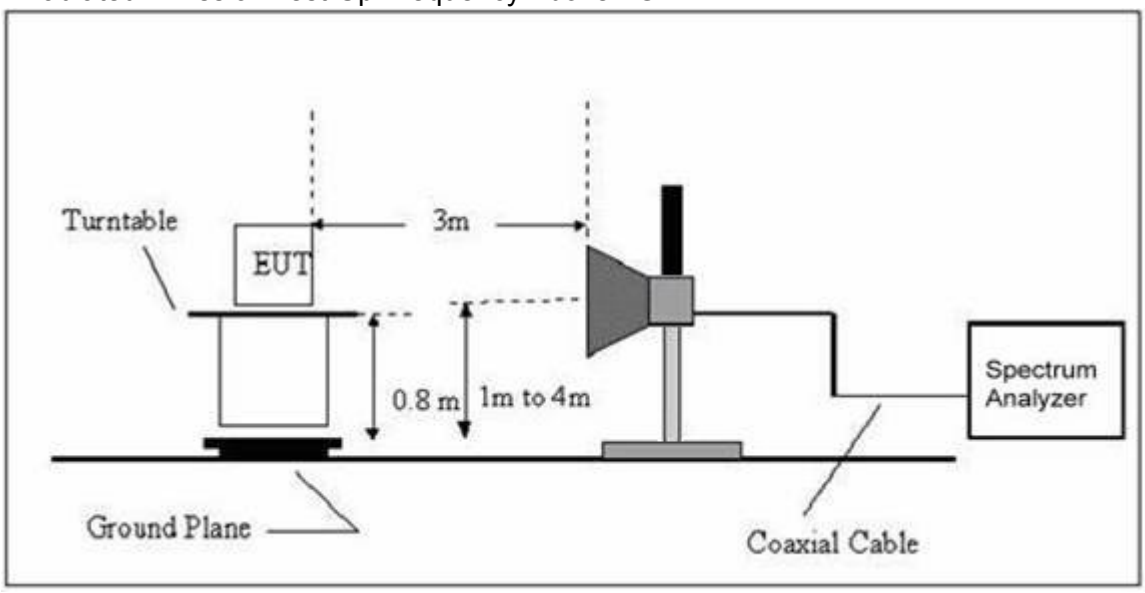
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT：	OPCOM-1	Model Name. ：	OPL301
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	--
Test Mode ：	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	P
--	--	--	--	P

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

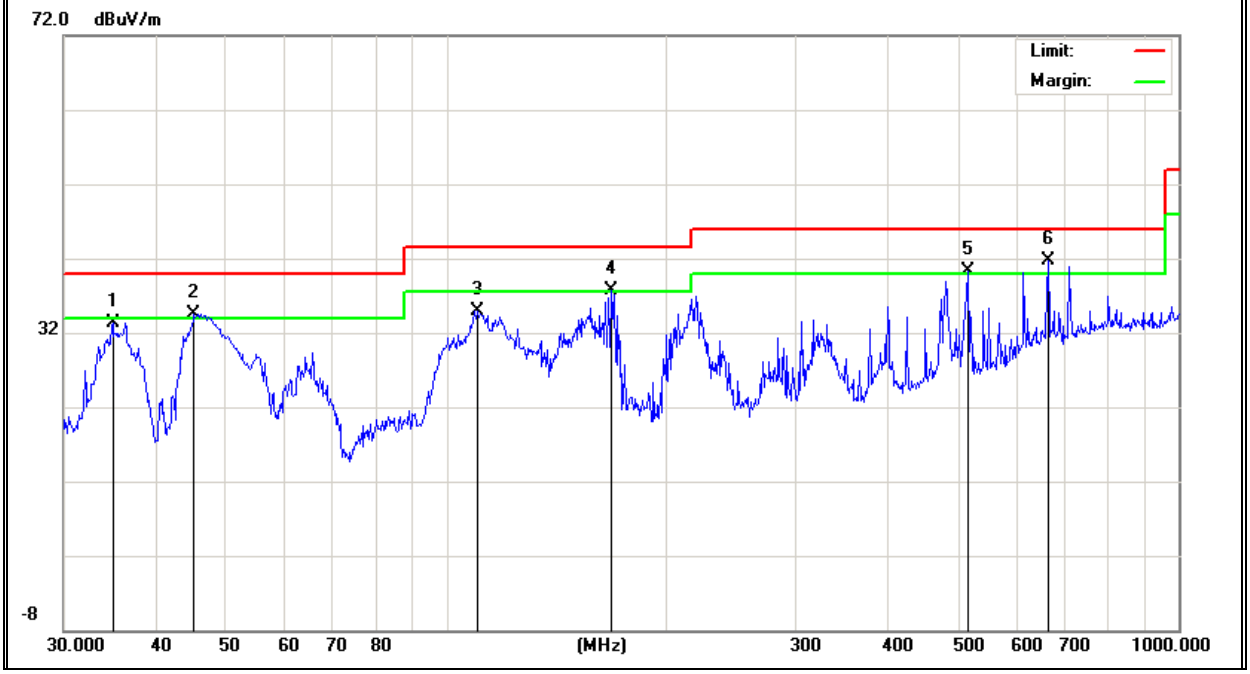
3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz
Test Mode ：	TX		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	35.0048	16.60	16.69	33.29	40.00	-6.71	QP
V	45.2165	22.73	11.87	34.60	40.00	-5.40	QP
V	110.1816	24.94	9.99	34.93	43.50	-8.57	QP
V	167.824	27.19	10.54	37.73	43.50	-5.77	QP
V	515.4374	19.61	20.62	40.23	46.00	-5.77	QP
V	663.4728	18.02	23.78	41.80	46.00	-4.20	QP

Remark:

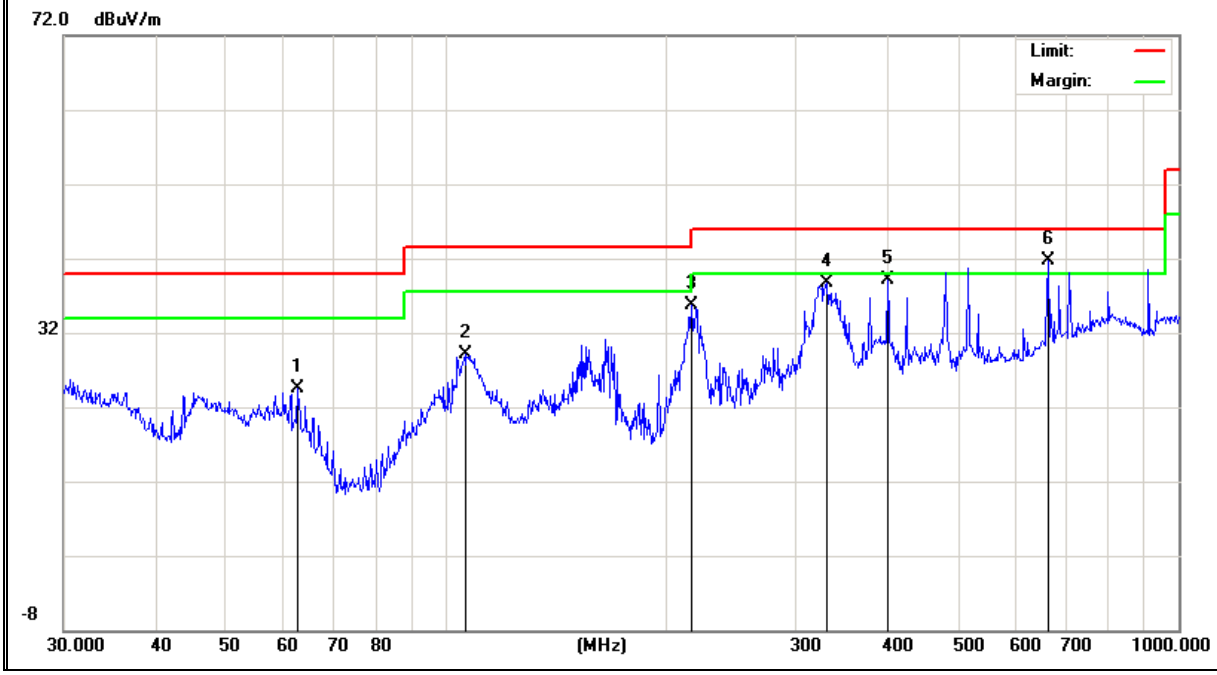
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	62.6507	17.23	7.24	24.47	40.00	-15.53	QP
H	106.385	19.58	9.60	29.18	43.50	-14.32	QP
H	216.024	23.78	11.86	35.64	46.00	-10.36	QP
H	331.3546	23.30	15.46	38.76	46.00	-7.24	QP
H	400.4318	20.76	18.32	39.08	46.00	-6.92	QP
H	663.4728	18.02	23.78	41.80	46.00	-4.20	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz
Test Mode ：	TX		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark	Comment
Low Channel (2412 MHz)							
4824.154	49.96	10.44	60.40	74.00	-13.60	Pk	Vertical
4824.154	31.28	10.44	41.72	54.00	-12.28	Av	Vertical
7236.259	43.25	12.39	55.64	74.00	-18.36	Pk	Vertical
7236.259	27.52	12.39	39.91	54.00	-14.09	Av	Vertical
4824.324	51.38	10.44	61.82	74.00	-12.18	Pk	Horizontal
4824.324	32.46	10.44	42.90	54.00	-11.10	Av	Horizontal
7236.269	43.92	12.39	56.31	74.00	-17.69	Pk	Horizontal
7236.269	29.09	12.39	41.48	54.00	-12.52	Av	Horizontal
Middel Channel (2437 MHz)							
4874.169	49.89	10.40	60.29	74.00	-13.71	Pk	Vertical
4874.169	30.8	10.40	41.20	54.00	-12.80	Av	Vertical
7311.236	43.58	12.75	56.33	74.00	-17.67	Pk	Vertical
7311.236	26.48	12.75	39.23	54.00	-14.77	Av	Vertical
4874.247	50.66	10.40	61.06	74.00	-12.94	Pk	Horizontal
4874.247	31.88	10.40	42.28	54.00	-11.72	Av	Horizontal
7311.236	42.77	12.75	55.52	74.00	-18.48	Pk	Horizontal
7311.236	27.46	12.75	40.21	54.00	-13.79	Av	Horizontal
High Channel (2462 MHz)							
4924.147	50.42	10.39	60.81	74.00	-13.19	Pk	Vertical
4924.147	32.38	10.39	42.77	54.00	-11.23	Av	Vertical
7386.269	43.82	12.68	56.50	74.00	-17.50	Pk	Vertical
7386.269	27.46	12.68	40.14	54.00	-13.86	Av	Vertical
4924.214	50.43	10.39	60.82	74.00	-13.18	Pk	Horizontal
4924.214	32.58	10.39	42.97	54.00	-11.03	Av	Horizontal
7386.133	42.83	12.68	55.51	74.00	-18.49	Pk	Horizontal
7386.133	28.07	12.68	40.75	54.00	-13.25	Av	Horizontal

Note: 802.11b mode is worse case.

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

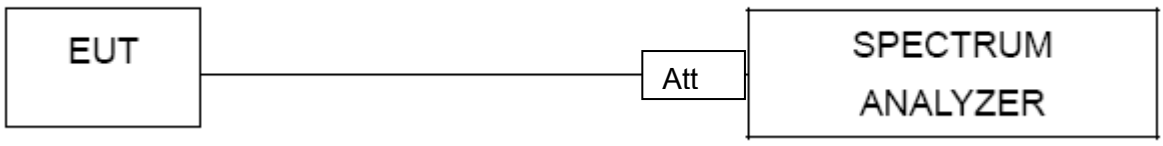
4.1.1 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. 3 kHz ≤Set the RBW≤100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



4.1.4 EUT OPERATION CONDITIONS

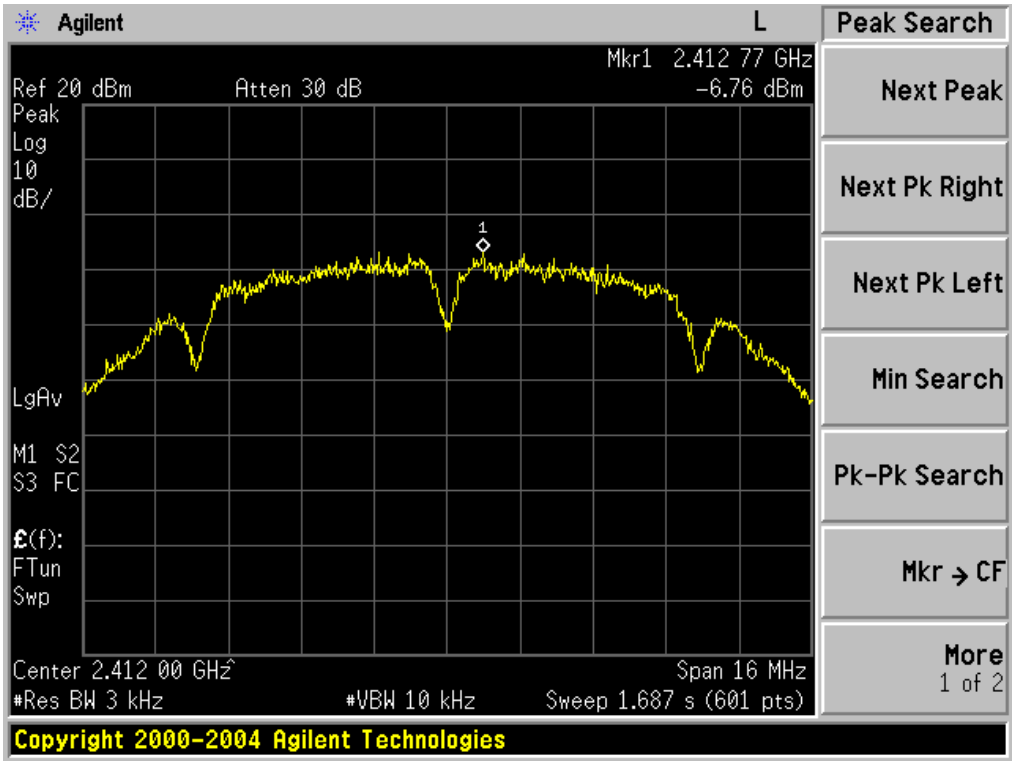
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.1.5 TEST RESULTS

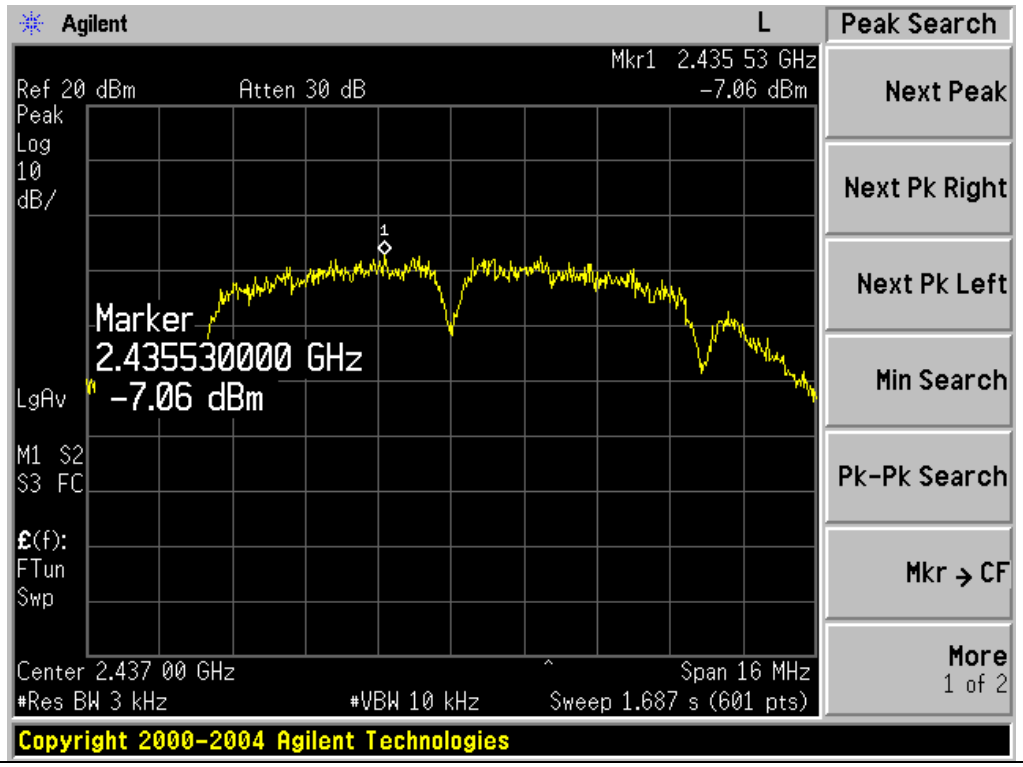
EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz
Test Mode ：	TX b Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-6.76	8	PASS
2437 MHz	-7.06	8	PASS
2462 MHz	-6.65	8	PASS

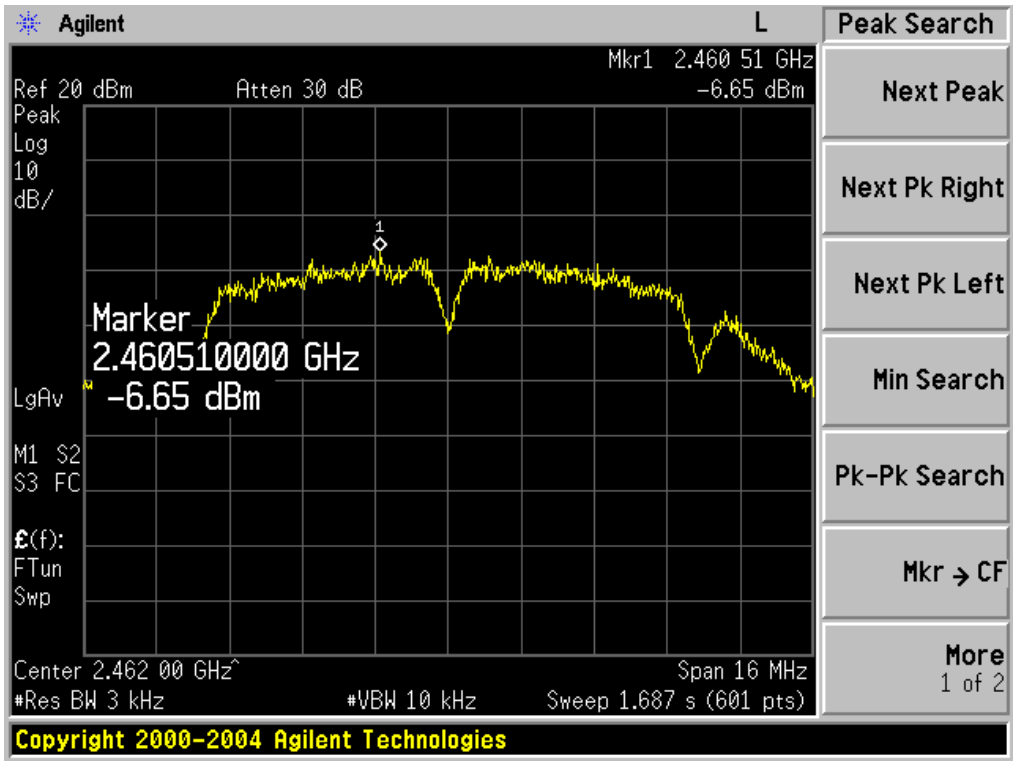
TX CH01



TX CH06



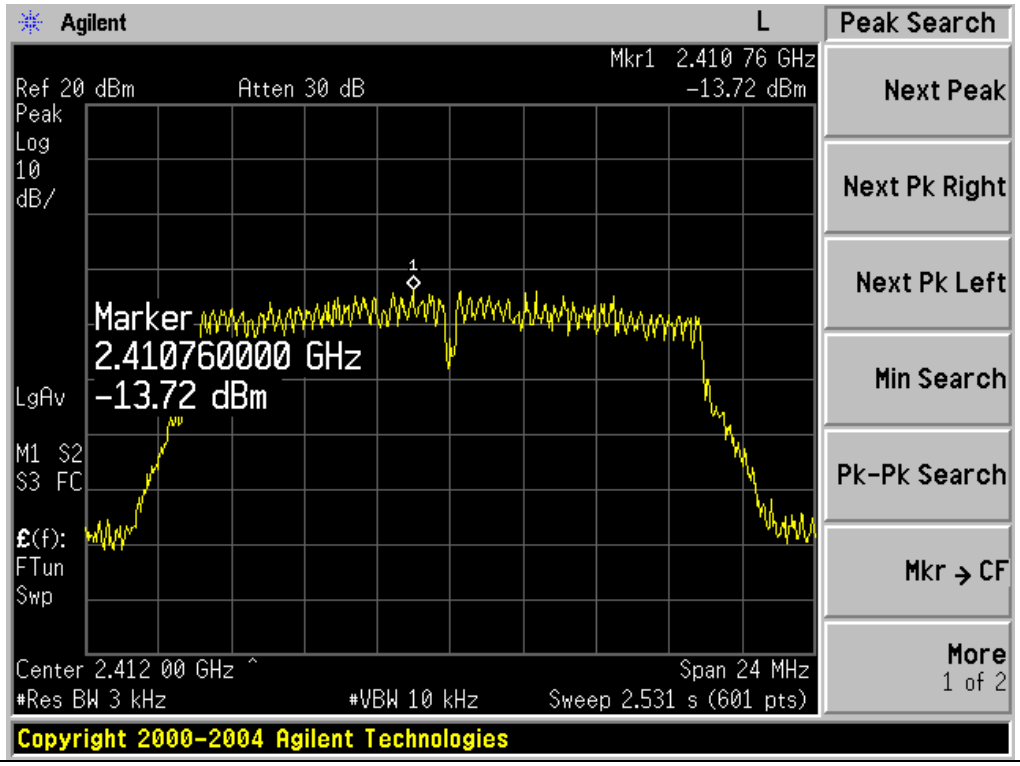
TX CH11



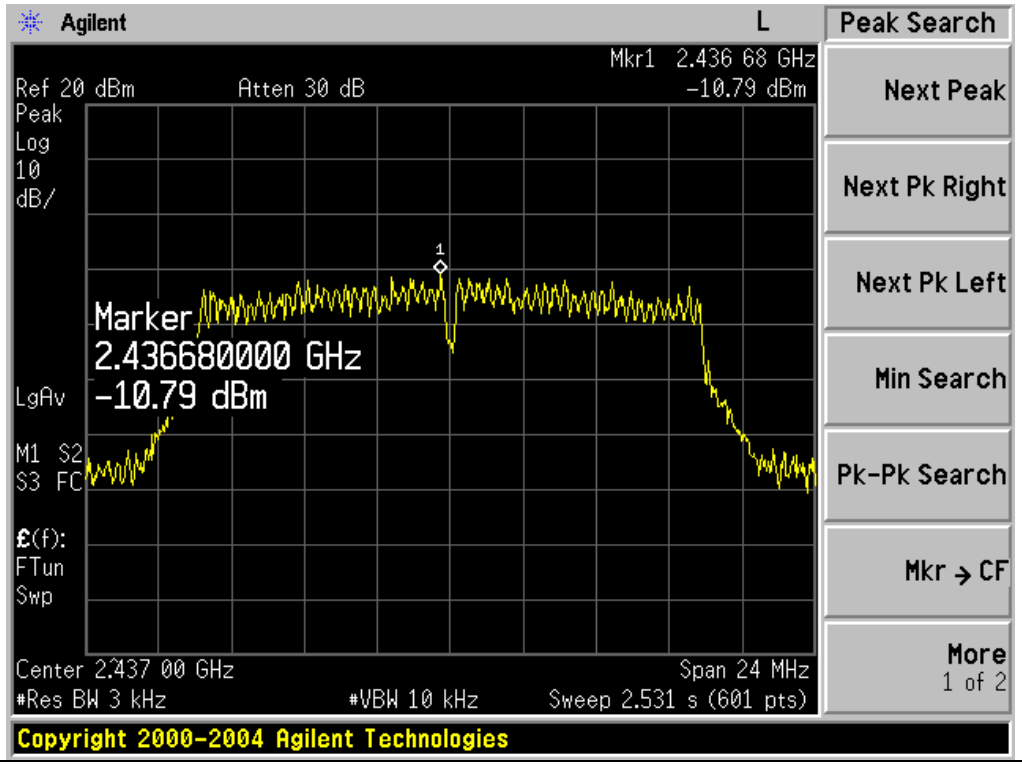
EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz
Test Mode ：	TX g Mode /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-13.72	8	PASS
2437 MHz	-10.79	8	PASS
2462 MHz	-11.38	8	PASS

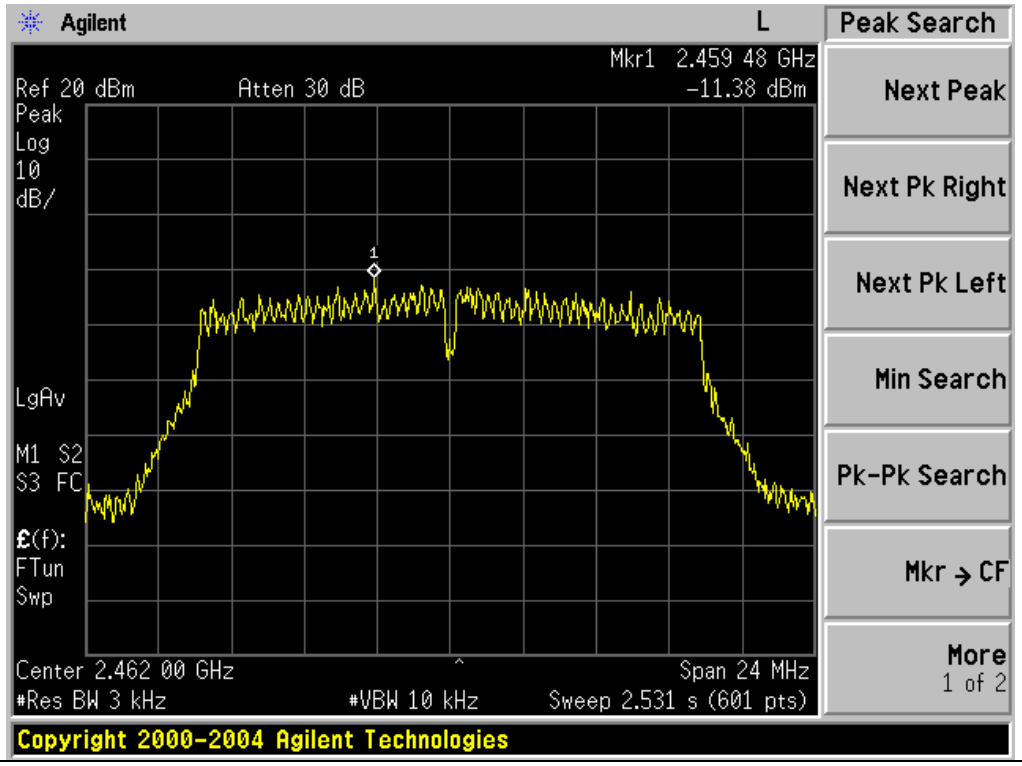
TX CH01



TX CH06



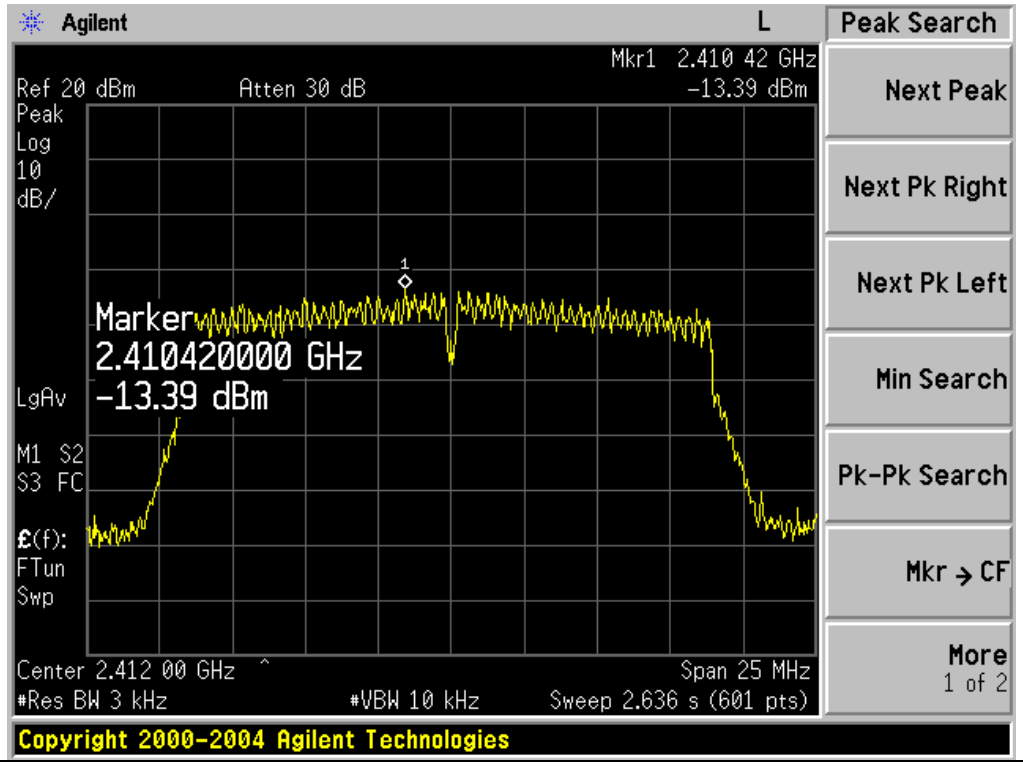
TX CH11



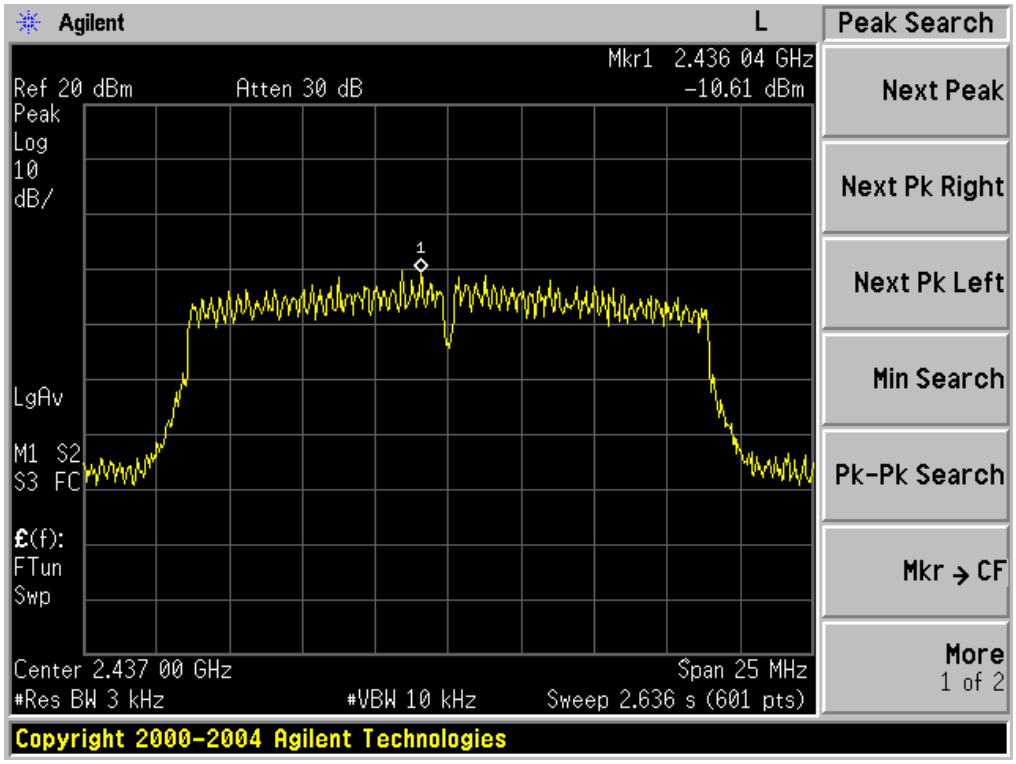
EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz
Test Mode ：	TX n Mode(20M) /CH01, CH06, CH11		

Frequency	Power Density (dBm)	Limit (dBm)	Result
2412 MHz	-13.39	8	PASS
2437 MHz	-10.61	8	PASS
2462 MHz	-12.47	8	PASS

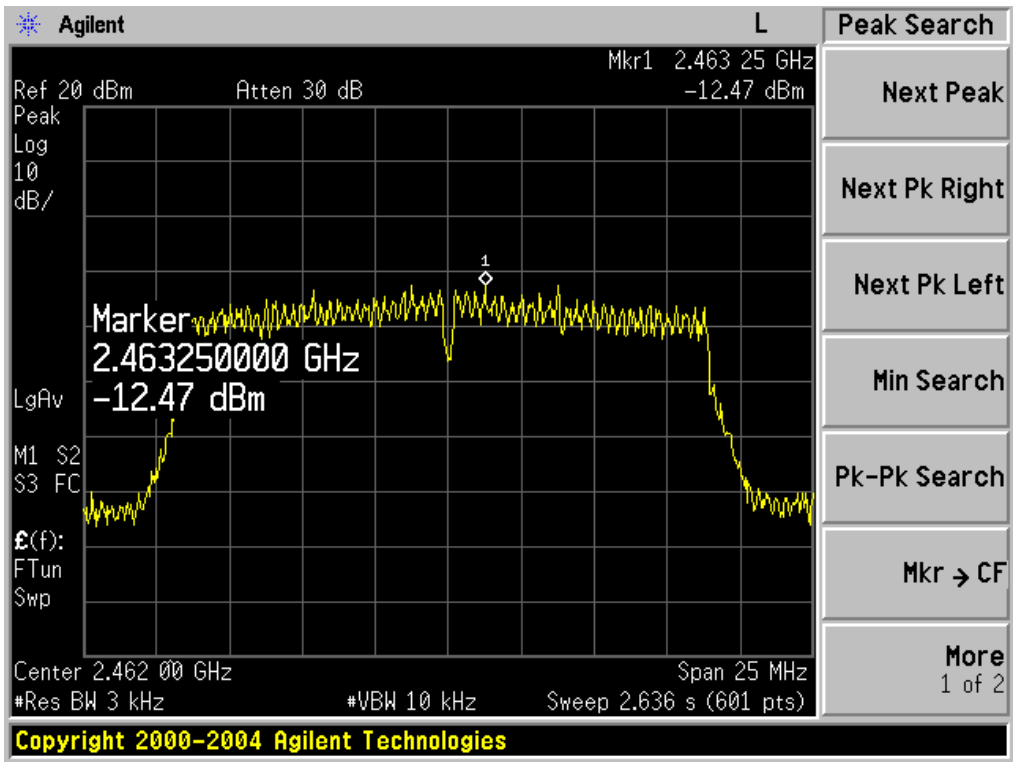
TX CH01



TX CH06



TX CH11



5. BANDWIDTH TEST

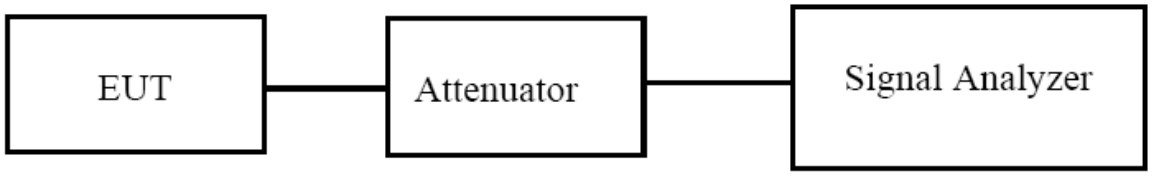
5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP



5.1.2 EUT OPERATION CONDITIONS

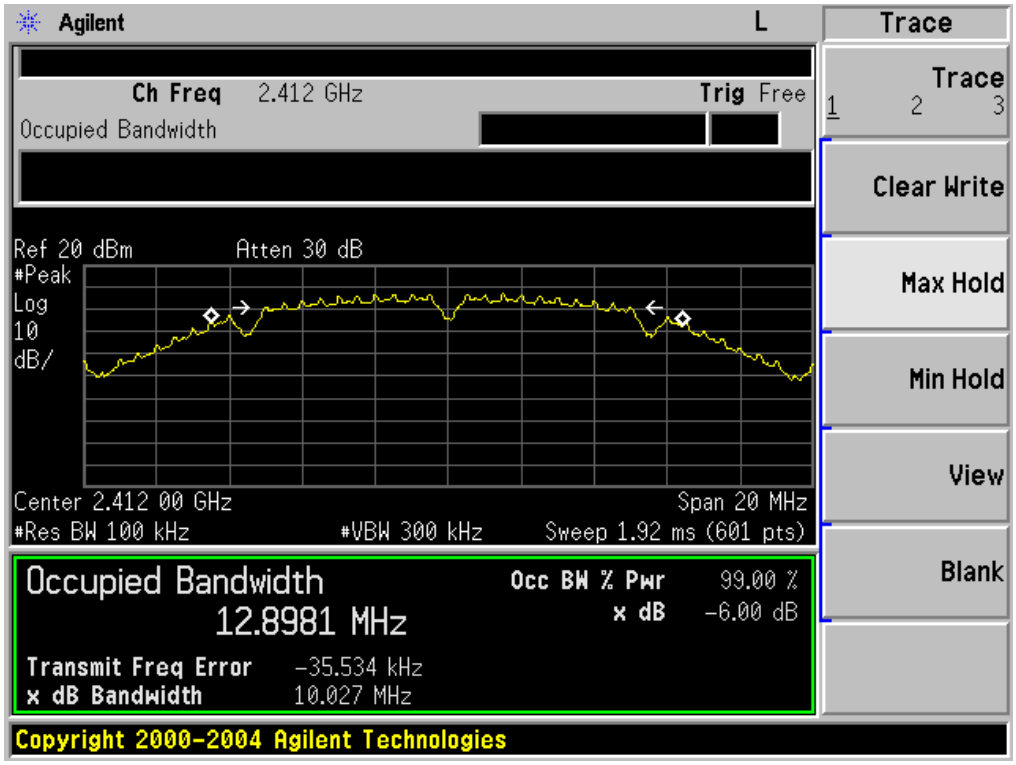
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.3 TEST RESULTS

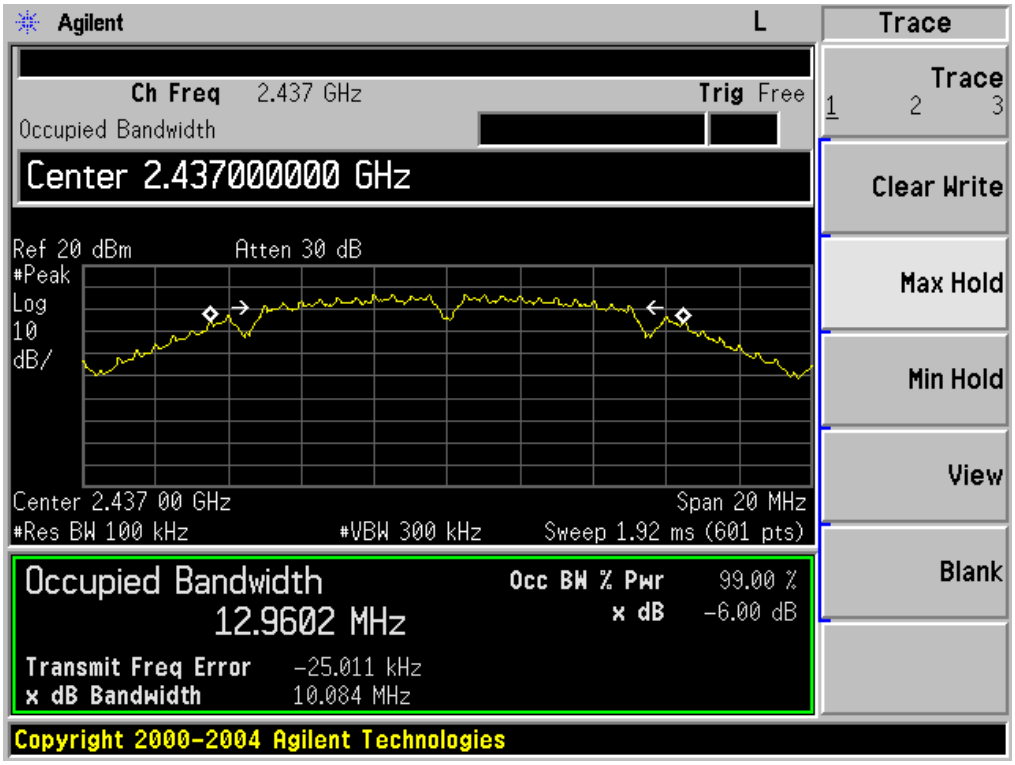
EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz
Test Mode ：	TX b Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.027	500	Pass
Middle	2437	10.084	500	Pass
High	2462	9.571	500	Pass

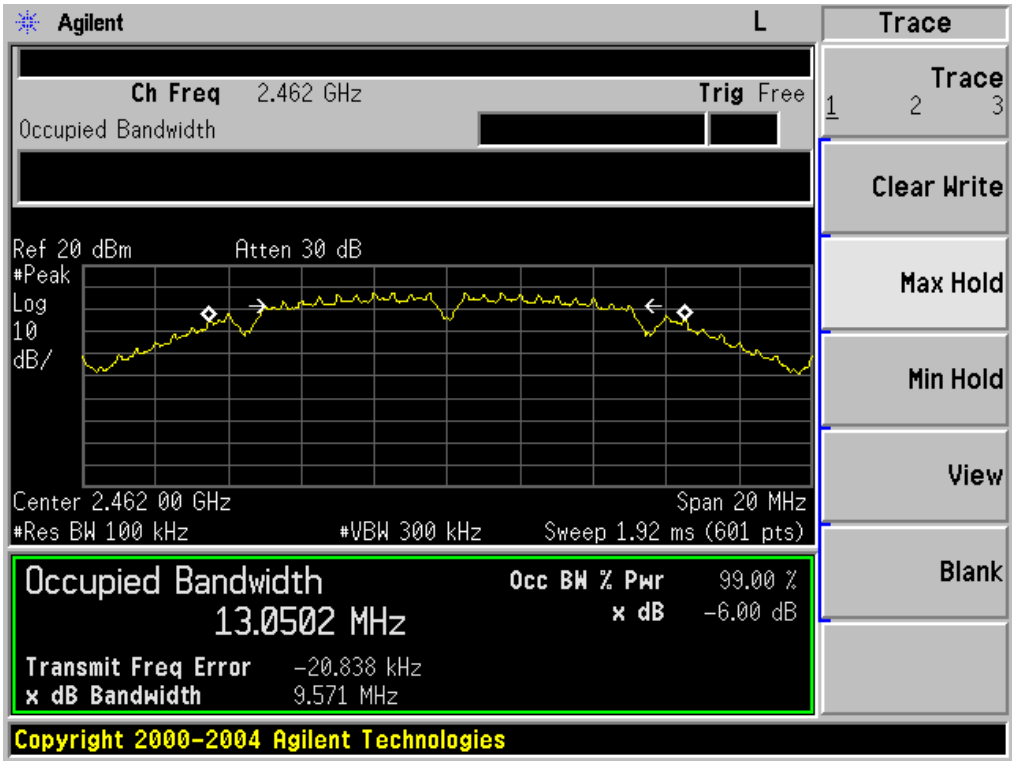
TX CH 01



TX CH 06



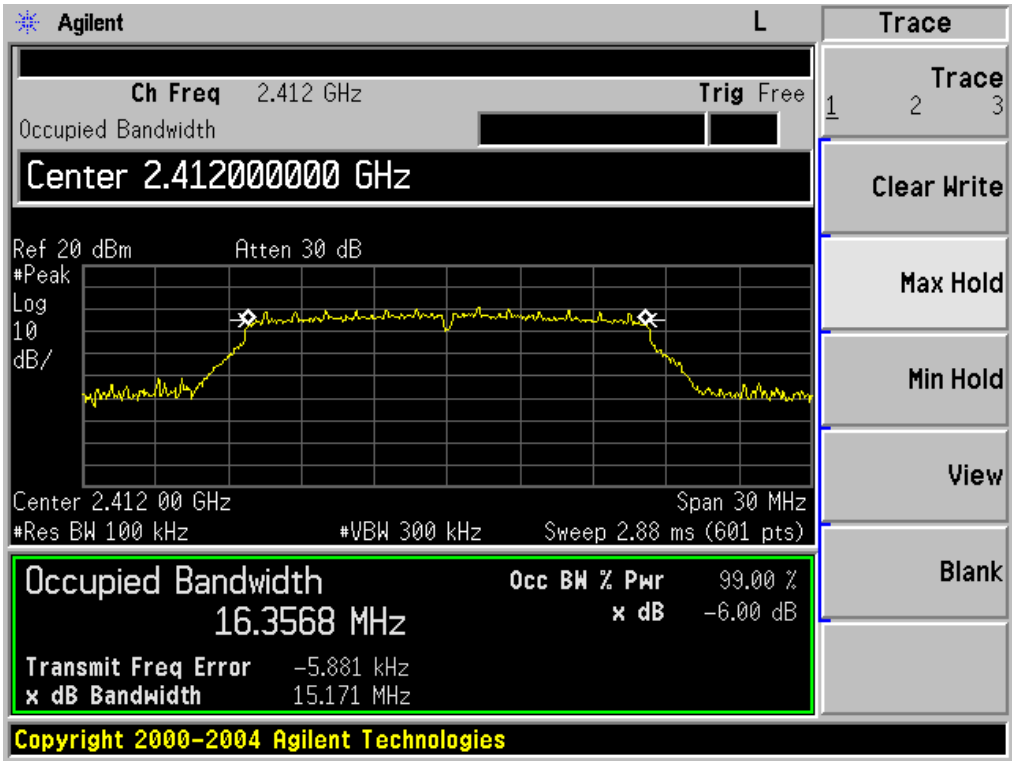
TX CH 11



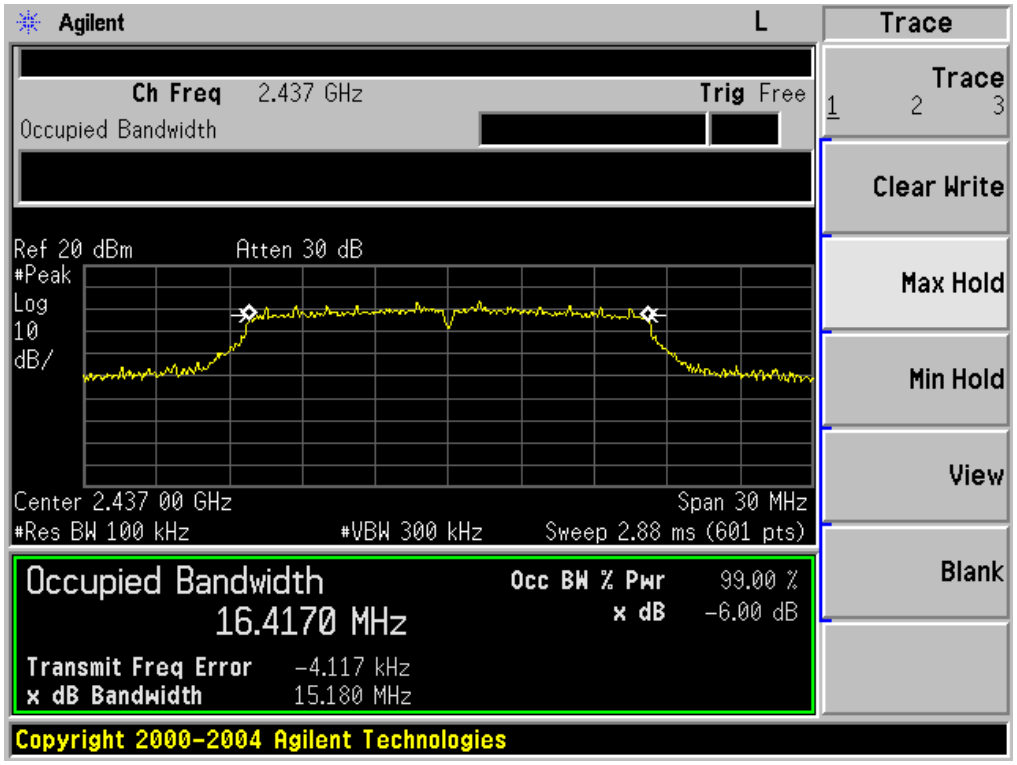
EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz
Test Mode ：	TX g Mode /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	15.171	500	Pass
Middle	2437	15.180	500	Pass
High	2462	15.346	500	Pass

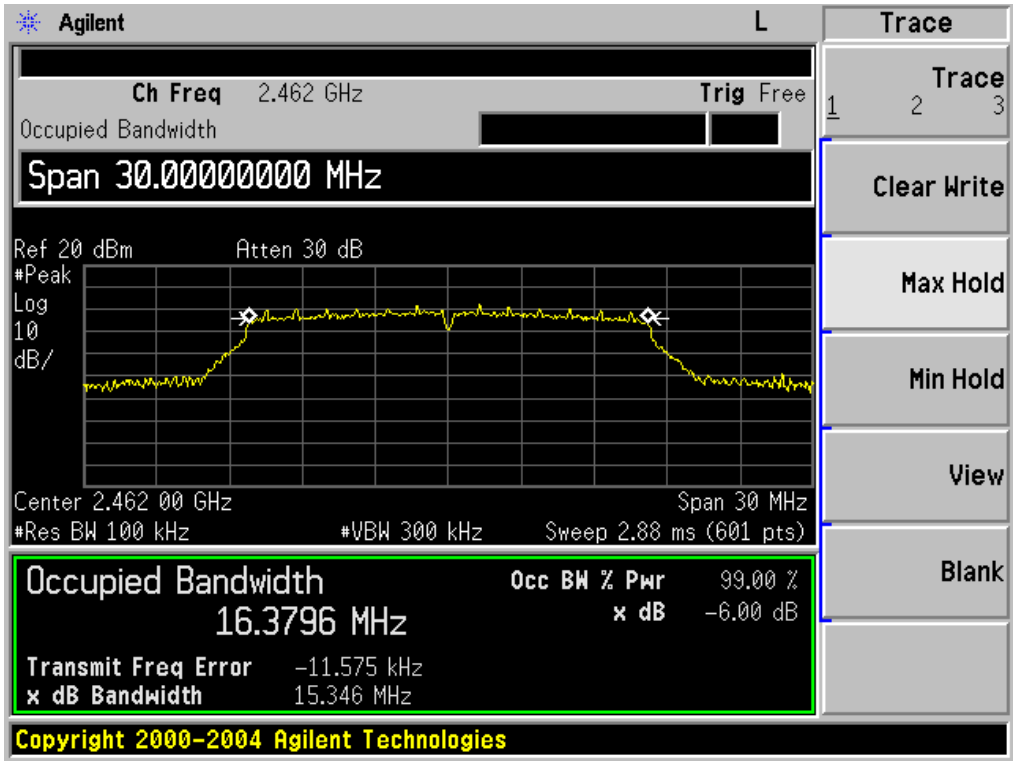
TX CH 01



TX CH 06



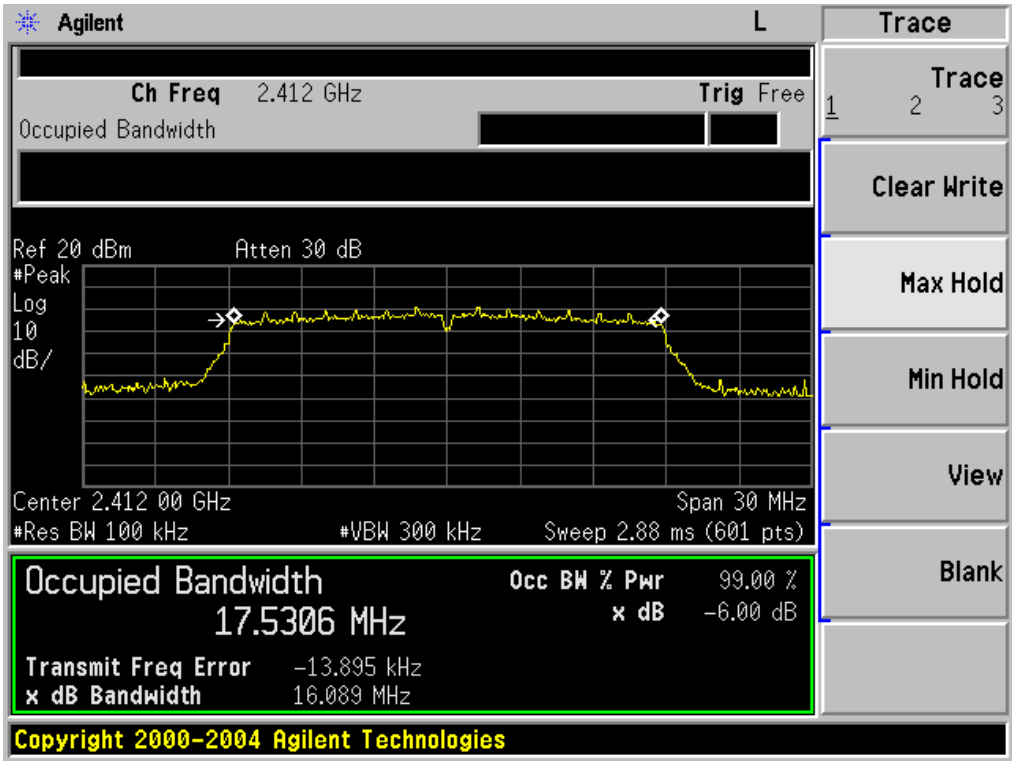
TX CH 11



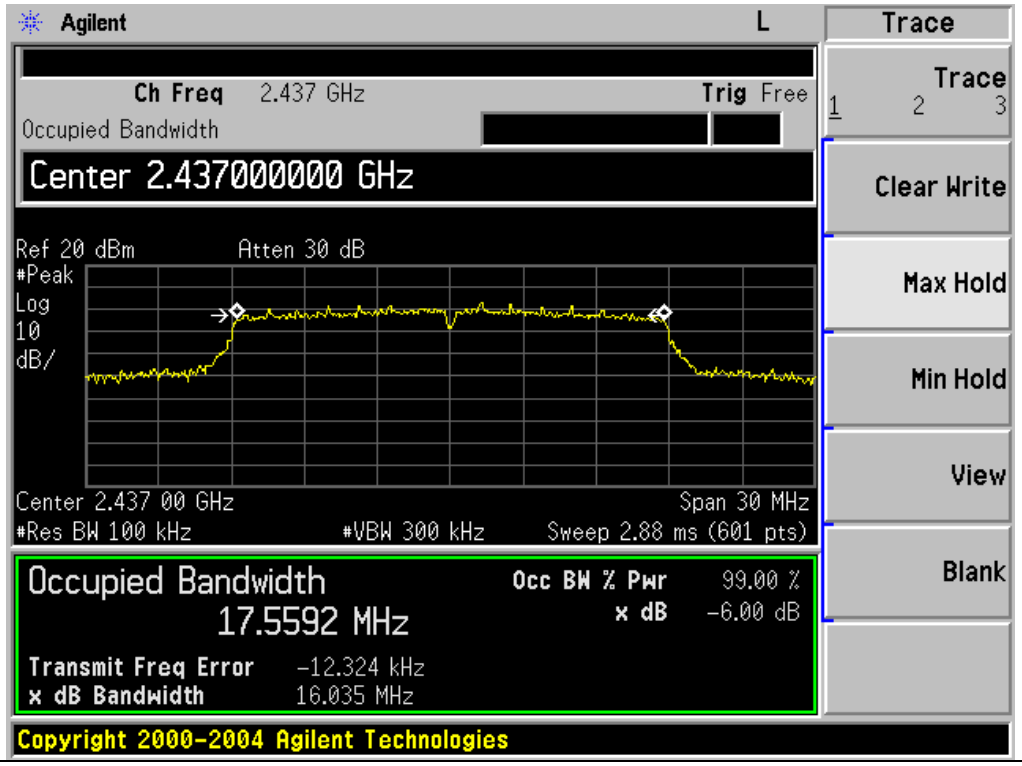
EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz
Test Mode ：	TX n Mode(20M) /CH01, CH06, CH11		

Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.089	500	Pass
Middle	2437	16.035	500	Pass
High	2462	16.730	500	Pass

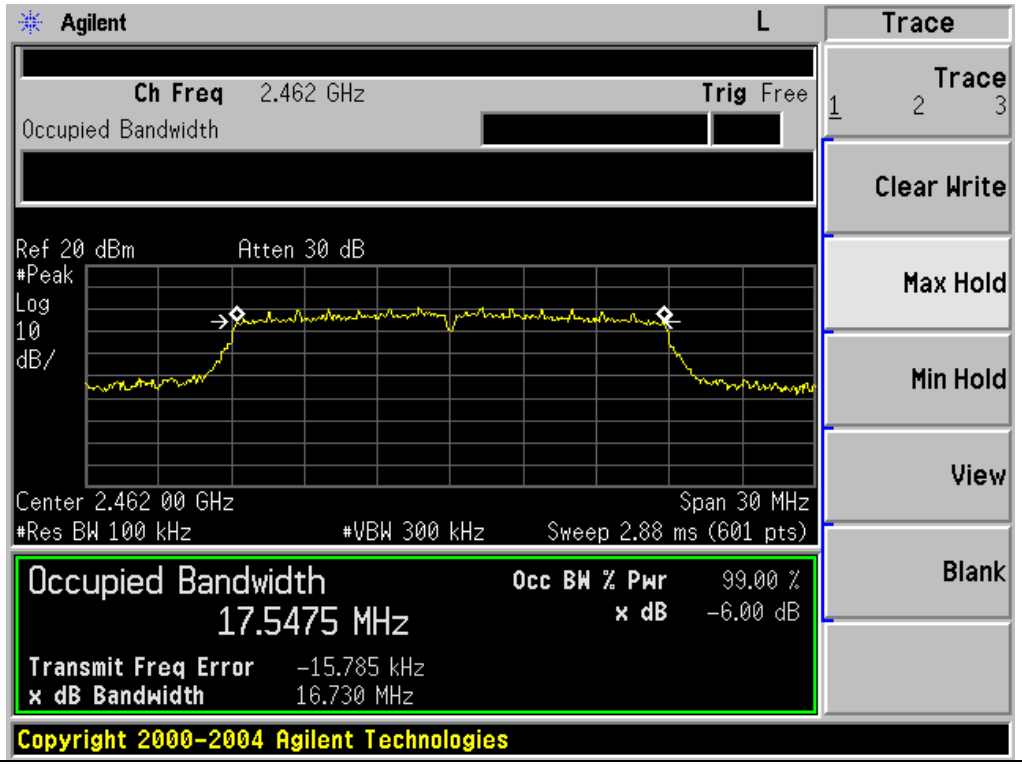
TX CH 01



TX CH 06



TX CH 11



6. PEAK OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

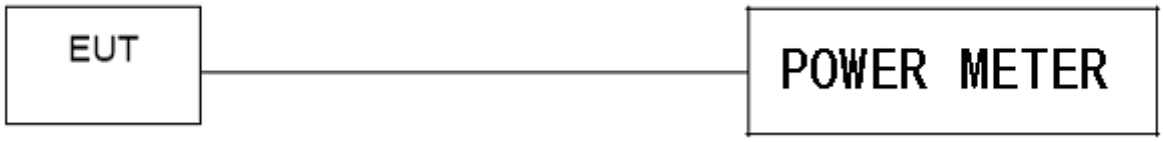
6.1.1 TEST PROCEDURE

a. The EUT was directly connected to the Power meter

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.5 TEST RESULTS

EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz
Test Mode ：	TX b/g/n20 Mode		

TX 802.11b Mode				
Test Channe	Frequency	Maximum Peak Conducted Output Power（PK）	Maximum Peak Conducted Output Power（AV）	LIMIT
	(MHz)	(dBm)	(dBm)	dBm
CH01	2412	16.58	11.52	30
CH06	2437	16.54	11.58	30
CH11	2462	16.44	11.44	30
TX 802.11g Mode				
CH01	2412	13.45	8.24	30
CH06	2437	13.23	8.02	30
CH11	2462	13.14	7.93	30
TX 802.11n(20) Mode				
CH01	2412	13.84	8.58	30
CH06	2437	13.72	8.46	30
CH11	2462	13.59	8.33	30

7. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

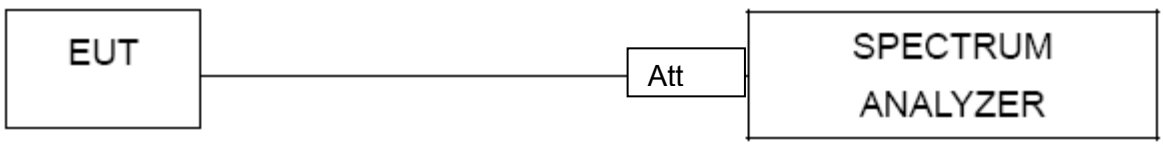
TEST PROCEDURE

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
e) Repeat above procedures until all measured frequencies were complete.

7.1 DEVIATION FROM STANDARD

No deviation.

7.2 TEST SETUP



7.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

7.4 TEST RESULTS

EUT：	OPCOM-1	Model Name ：	OPL301
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 12V form Adapter AC 120V/60Hz

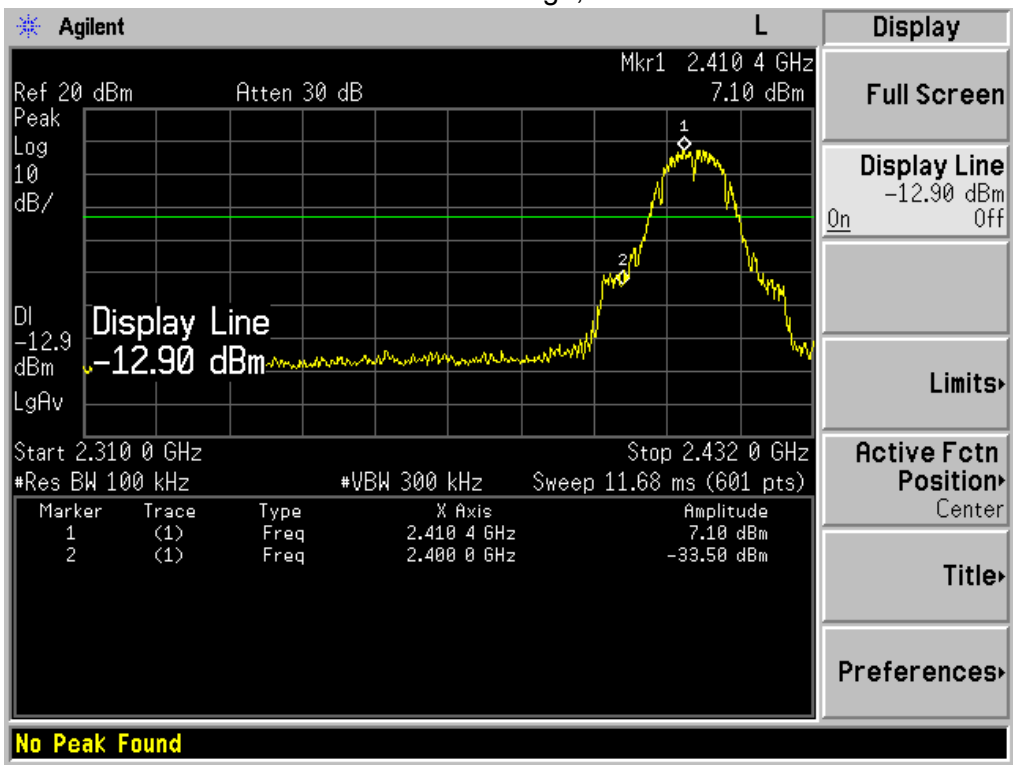
Frequency Band	Delta Peak to band emission (dBc)	＞Limit (dBc)	Result
802.11b			
2400	40.60	20	Pass
2483.5	55.87	20	Pass
802.11g			
2400	36.48	20	Pass
2483.5	46.51	20	Pass
802.11n20			
2400	34.39	20	Pass
2483.5	44.90	20	Pass

Radiated band edge:

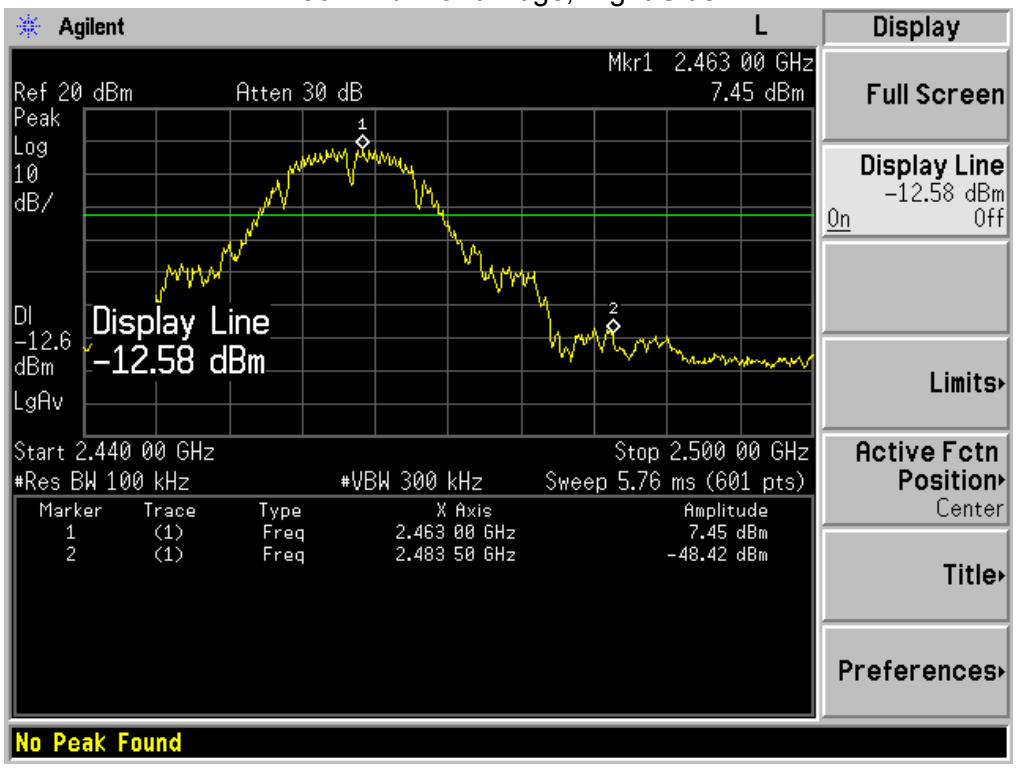
Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
802.11b							
2390	58.15	-13.06	45.09	74	-28.91	peak	Vertical
2390	57.89	-13.06	44.83	74	-29.17	peak	Horizontal
2483.5	59.08	-12.78	46.3	74	-27.70	peak	Vertical
2483.5	59.13	-12.78	46.35	74	-27.65	peak	Horizontal
802.11g							
2390	58.05	-13.06	44.99	74	-29.01	peak	Vertical
2390	57.23	-13.06	44.17	74	-29.83	peak	Horizontal
2483.5	58.94	-12.78	46.16	74	-27.84	peak	Vertical
2483.5	59.16	-12.78	46.38	74	-27.62	peak	Horizontal
802.11n20							
2390	60.27	-13.06	47.21	74	-26.79	peak	Vertical
2390	60.05	-13.06	46.99	74	-27.01	peak	Horizontal
2483.5	60.19	-12.78	47.41	74	-26.59	peak	Vertical
2483.5	60.31	-12.78	47.53	74	-26.47	peak	Horizontal

Note: Test method to see chapter 3.2 . When PK value is lower than the Average value limit, average not record.

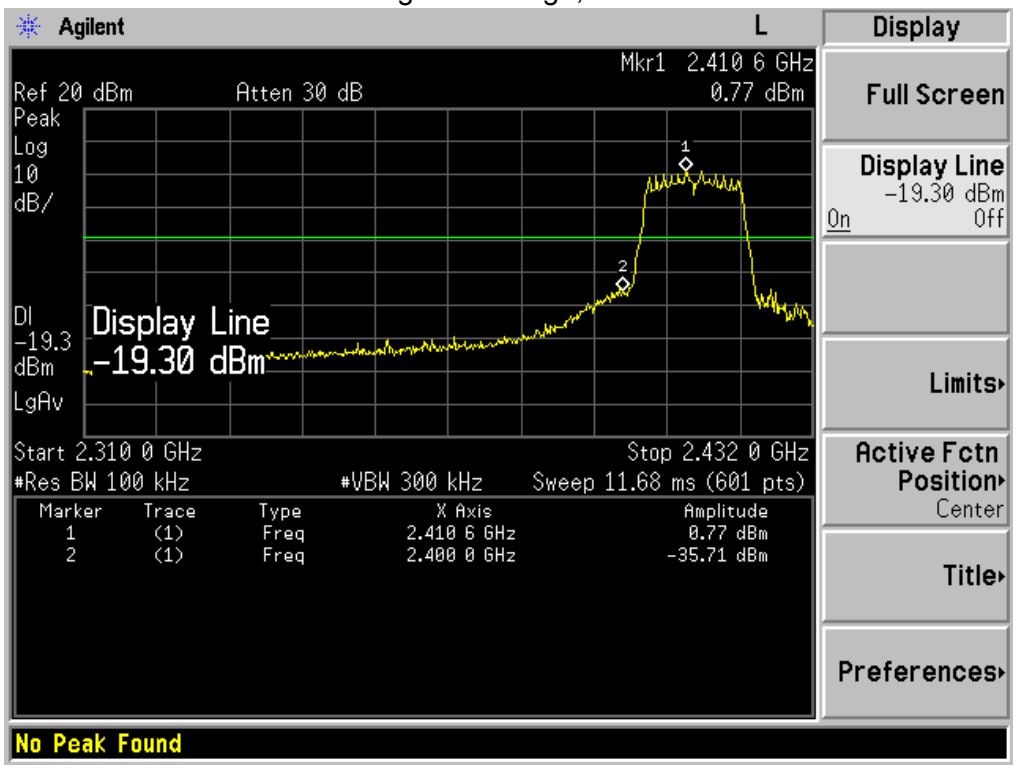
802.11b: Band Edge, Left Side



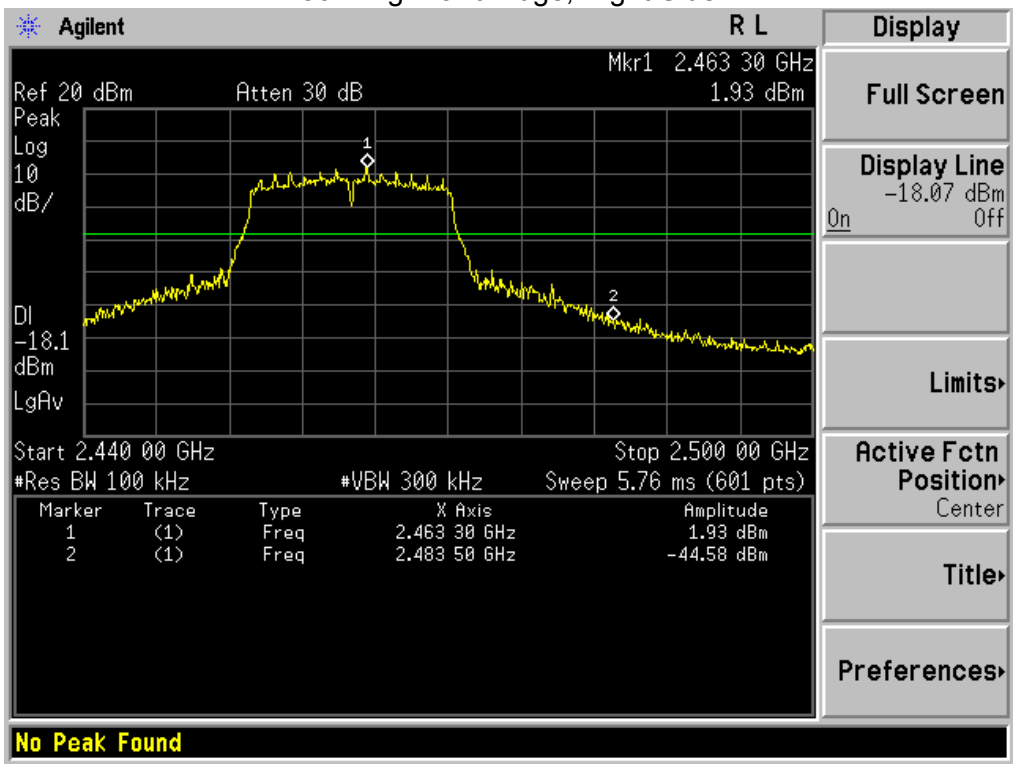
802.11b: Band Edge, Right Side



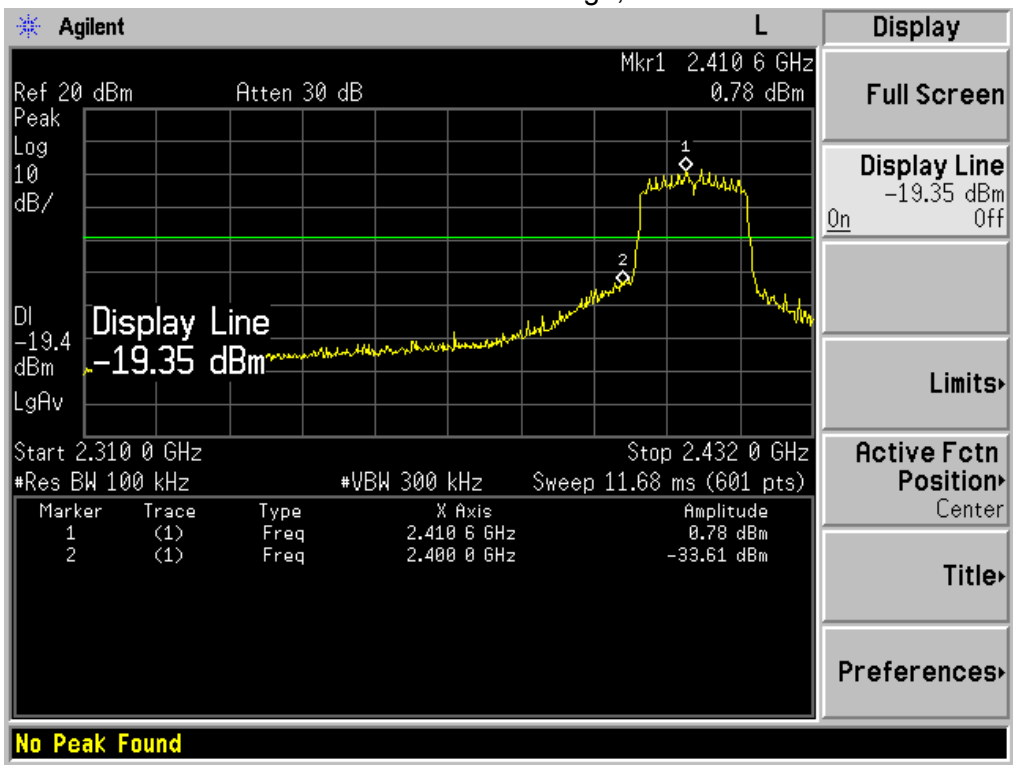
802.11g: Band Edge, Left Side



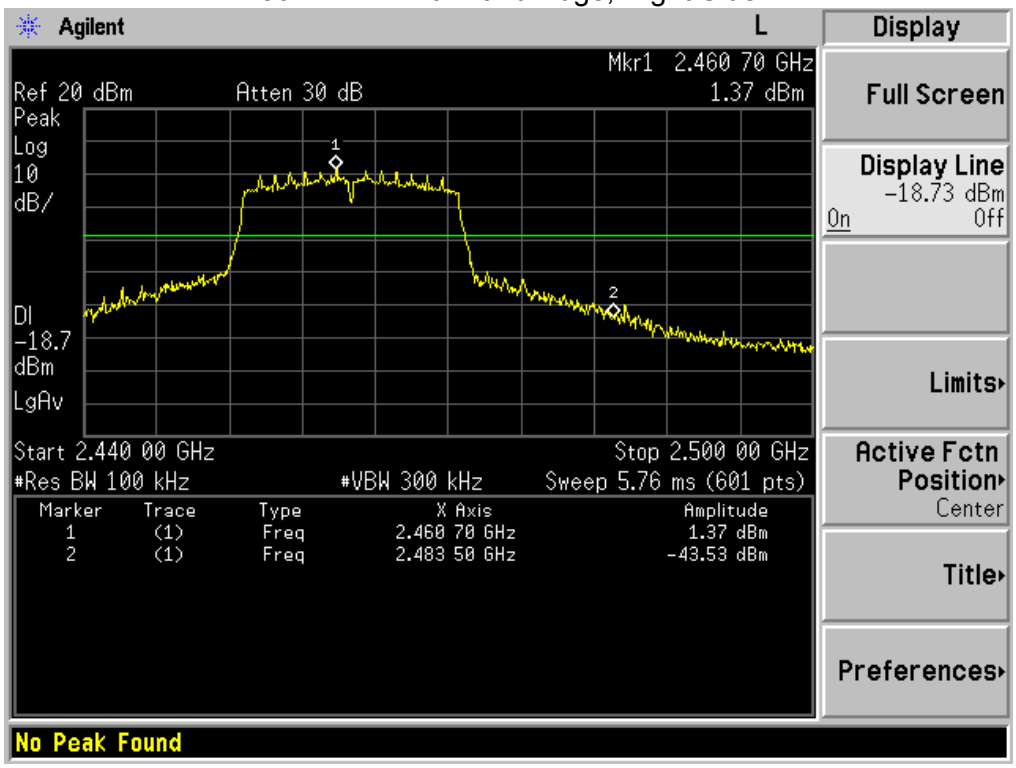
802.11g: Band Edge, Right Side



802.11n-HT20: Band Edge, Left Side



802.11n-HT20: Band Edge, Right Side



8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

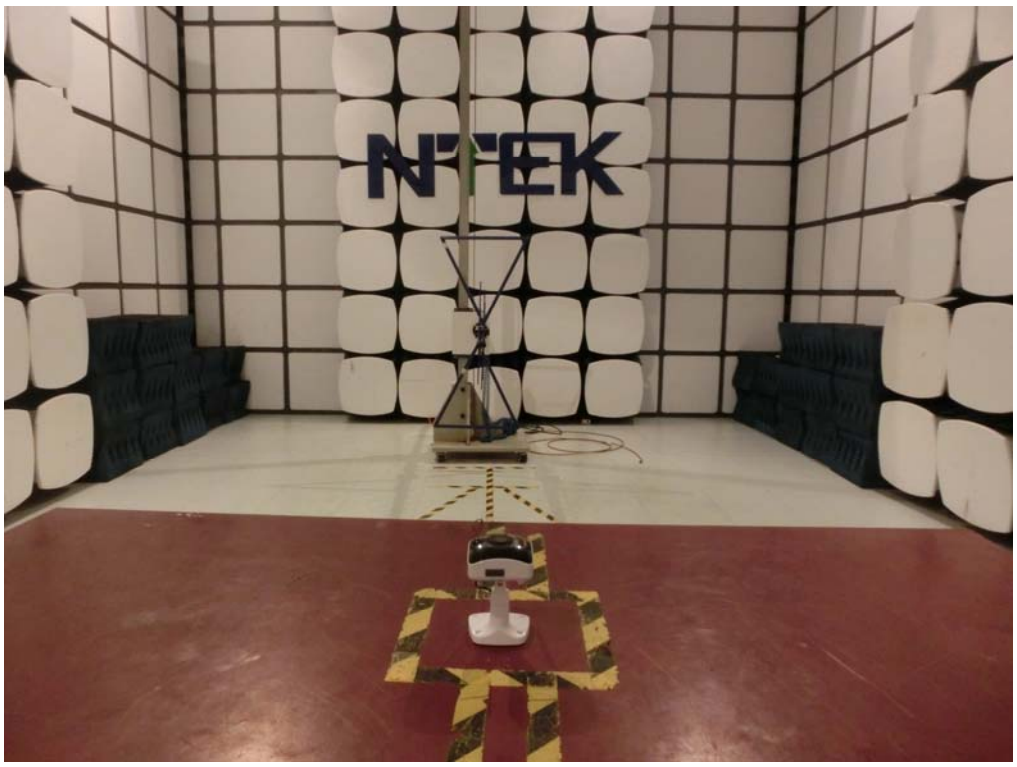
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

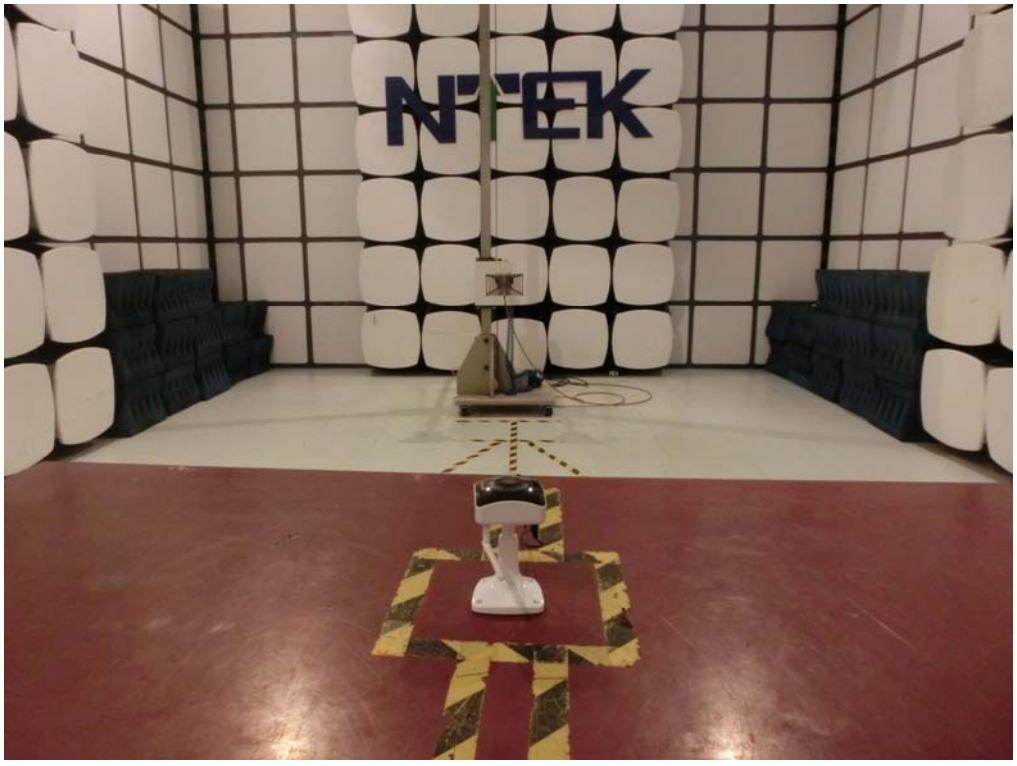
8.2 EUT ANTENNA

The EUT antenna is unique connector antenna(R-SMA), detailed in the internal photos, It comply with the standard requirement.

9. EUT TEST PHOTO

Radiated Measurement Photos





Conducted Measurement Photos