RFI / EMI TEST REPORT

EUT Name	:	Wi-Fi Module
Model No.	:	GA1000
FCC ID.	:	XOJGA1000
Applicant	:	Tibbo Technology Inc.
Address	:	9F-3, NO. 31, LANE 169, KANG-NING ST., HSI-CHIH, TAIPEI, TAIWAN
Regulation	:	CFR 47, Part 15 Subpart C
Test Site	:	PEP Testing Laboratory
Test Engineer	:	IVAN HUANG
Test Date	:	AUG. 11, 2009 – NOV. 24, 2009
Issued Date	:	NOV. 25, 2009
Report No.	:	E980805-1

VERIFICATION

WE HEREBY VERIFY THAT :

The EUT listed below has completed RFI testing by PEP Testing Laboratory and it does comply with the limitation of FCC Part 15 subpart C, Section 15.247 limitations.

The tested configurations and the facility comply with the radiated and AC line conducted test site criteria in FCC Part15, Section 15.31(m) .

Any data in this RFI report is **" reference "** only.

APPLICANT	:	**Tibbo Technology Inc.**
PRODUCT	:	**Wi-Fi Module**
FCC ID.	:	**XOJGA1000**
MODEL NO.	:	**GA1000**

M. Y. TSUI / General Manager

PEP Testing Laboratory

Designation No.: TW1046

NO. 9-6, Huzi, Hubei Village, Linkou Shiang, Taipei Hsien, Taiwan 244, R. O. C.

TEL : 886-2-26021042 FAX : 886-2-26021045

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1. Product Information

EUT Name:	Wi-Fi Module
Channel No.：	11 Channel
Frequency Range:	2.412GHz~2.462GHz
Modulation:	IEEE 802.11b/g
Data Rate:	1M/2M/5.5M/11Mbps for 802.11b 6M/9M/12M/18M/24M/36M/48M/54Mbps for 802.11g
Internal Crystal / Osc.：	N/A
Power Rating:	Adapter --- Model No. : SP41-120500 Input: AC 120V 60Hz Output: DC 12V 500mA
Antenna Type:	Dipole Antenna RP-SMA(M)
Antenna Gain :	5 dBi (numeric 3.16)
Case:	N/A

2. General Information

2.1 Test Mode and Procedure

Test Channel: As required by FCC Part15, Section 15.31(m) measurements on intentional radiators or receiver should be performed at three frequencies for operating frequency over 10MHz, one near top, one near middle and one near bottom.

Due to the support channels are 11 channels, the selected three frequencies for testing would be 2.412GHz near top for CH LOW, 2.437GHz near middle for CH MID and 2.462GHz near bottom for CH HIGH.

Mode	Operation Modes of EUT for Preliminary test
Channel Low Mode (2412MHz)	Using controller that is customer provides to control EUT test in the status of Channel Low frequency and transmit continuously.
Channel Mid Mode (2437MHz)	Using controller that is customer provides to control EUT test in the status of Channel Mid frequency and transmit continuously.
Channel High Mode (2462MHz)	Using controller that is customer provides to control EUT test in the status of Channel High frequency and transmit continuously.

After preliminary test, the worst-case test result was recorded and provided in the report.

Test step:

1. EUT connect with PC via controller, and set up on the table according to regulation.
2. Turning on the EUT and peripheral. Then execute EUT's main function and enable peripheral which is EUT connection.
3. Execute GA1000TXRF program to choose test channel and make EUT transmit continuously.
4. Starting to test.

2.2 Test Software(s) Used

GA1000TXRF: Through controller to control transmit frequency of EUT.

2.3 Modification(s)

N/A

3. Support Equipment Used

Embedded Module (RX)	**Manufacturer：** GIGATEK INC. **Model Number：** EM1206EV, EM1206

4. Measurement Result Summary

Modulation: IEEE 802.11b/g

Test Item	Result
§15.247(b)(4) Antenna gain<6dBi	■Yes ☐No Read: 5 dBi
Channel Listing	■Ok
§15.247(a)(1) Hopping Channel Frequency Separated Limit>25KHz or -20dB Bandwidth, whichever is greater	■N/A ☐Pass ☐Fail Read: ___KHz
§15.247(a)(1)(iii) Dwell Time Limit(t)<0.4(s)	■N/A ☐Pass ☐Fail Read: _____s
§15.247(a)(2) -6dB Bandwidth Limit>500KHz	☐N/A ■Pass ☐Fail Read: 10000 KHz
§15.247(b)(2) Maximum peak radiated output power Non-overlapping channel>75 Limit<1 Watt	■N/A ☐Pass ☐Fail Low:_____W (H) Mid :_____W (H) High:_____W (H)
§15.247(b)(3) Maximum peak radiated output power Limit<1 Watt	☐N/A ■Pass ☐Fail Low: $16x10^{-3}$ W (H) Mid : $6x10^{-3}$ W (H) High: $4x10^{-3}$ W (H)
§15.247(d) 100KHz outside band test (i) Band edge measurement (ii) 30MHz~25GHz spurious emission (iii) 150KHz~30MHz AC line conducted emission test	■Pass ☐Fail
§15.247(e) The power spectral density Limit<8dBm	☐N/A ■Pass ☐Fail Low: 3.01 dBm (H) Mid : -2.44 dBm (H) High: -2.29 dBm (H)
§15.247(e)(i) MPE calculation	■Pass ☐Fail

5. Channel Listing

a. EUT Type：Wi-Fi Module		
b. EUT Model：GA1000		
c. TX Channel No.：11		
Channel 01: 2412 MHz	Channel 02: 2417 MHz	Channel 03: 2422 MHz
Channel 04: 2427 MHz	Channel 05: 2432 MHz	Channel 06: 2437 MHz
Channel 07: 2442 MHz	Channel 08: 2447 MHz	Channel 09: 2452 MHz
Channel 10: 2457 MHz	Channel 11: 2462 MHz	

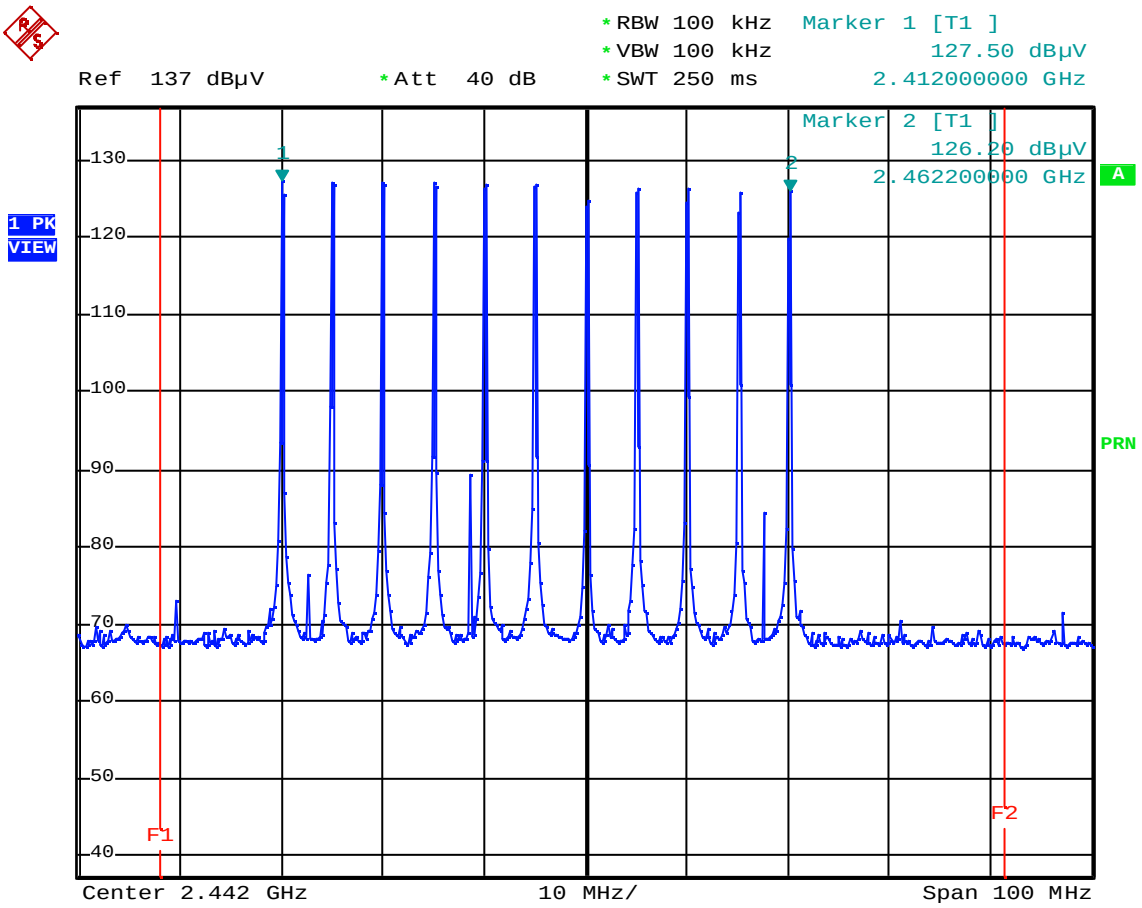
Frequency Range: 2.4 GHz --- 2.4835 GHz

Note: All channels located in the frequency range as below:

2.4 GHz --- 2.4835 GHz ■ Yes ☐ No

Typical Channel for testing:

Channel	Channel Number	Frequency (GHz)
LOW	1	2.412
MID	6	2.437
HIGH	11	2.462



Date: 20.SEP.2009 14:53:12

6. §15.247(a)(2): -6dB Bandwidth

Limit > 500KHz

6.1 Test Procedure

(1)The -6dB bandwidth was measured at the EUT antenna terminal in max hold analyzer mode with span wide enough to capture the hopping channel emissions.

(2)Set the Spectrum as RBW=VBW=100KHz

(3)6.3 Spectrum Plot Data show the -6dB Bandwidth test results.

6.2 Test Result of Bandwidth

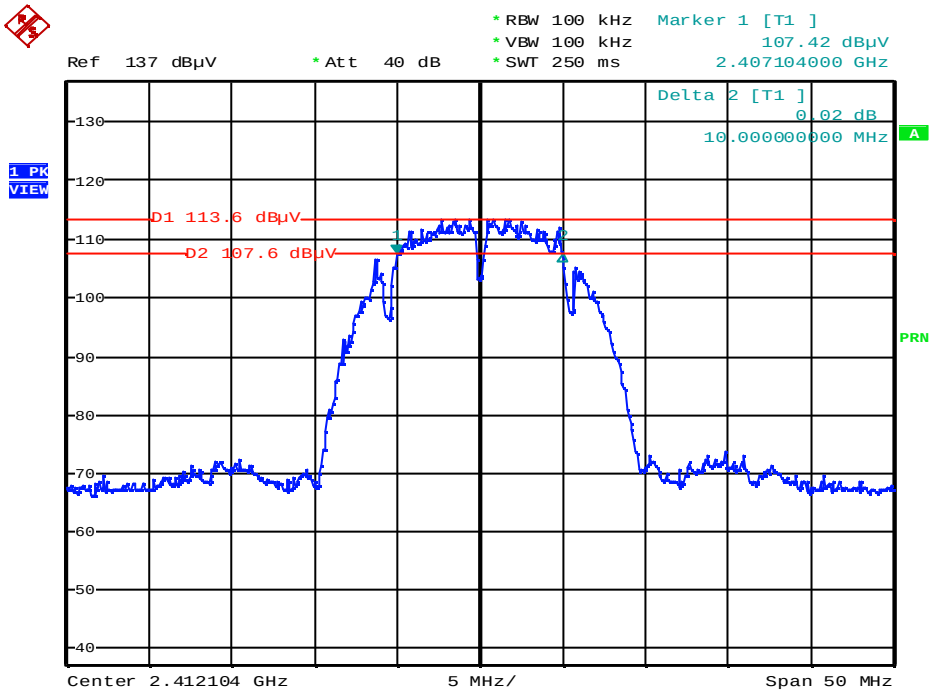
IEEE 802.11b			
Data rate / result	**Channel**		
	Low CH1 (KHz)	**Mid CH6 (KHz)**	**High CH11 (KHz)**
1 Mbps	10000	10000	10000
2 Mbps	10000	10000	10000
5.5 Mbps	10000	10000	10000
11 Mbps	10000	10000	10000
Remark	11Mbps spectrum plot data provide on page 12-13.		

IEEE 802.11g			
Data rate / result	**Channel**		
	Low CH1 (KHz)	**Mid CH6 (KHz)**	**High CH11 (KHz)**
6 Mbps	10400	10400	10400
9 Mbps	16400	16400	16400
12 Mbps	16400	16400	16400
18 Mbps	16600	16600	16600
24 Mbps	16600	16600	16600
36 Mbps	16600	16600	16600
48 Mbps	16600	16600	16600
54 Mbps	16600	16600	16600
Remark	54Mbps spectrum plot data provide on page 14-15.		

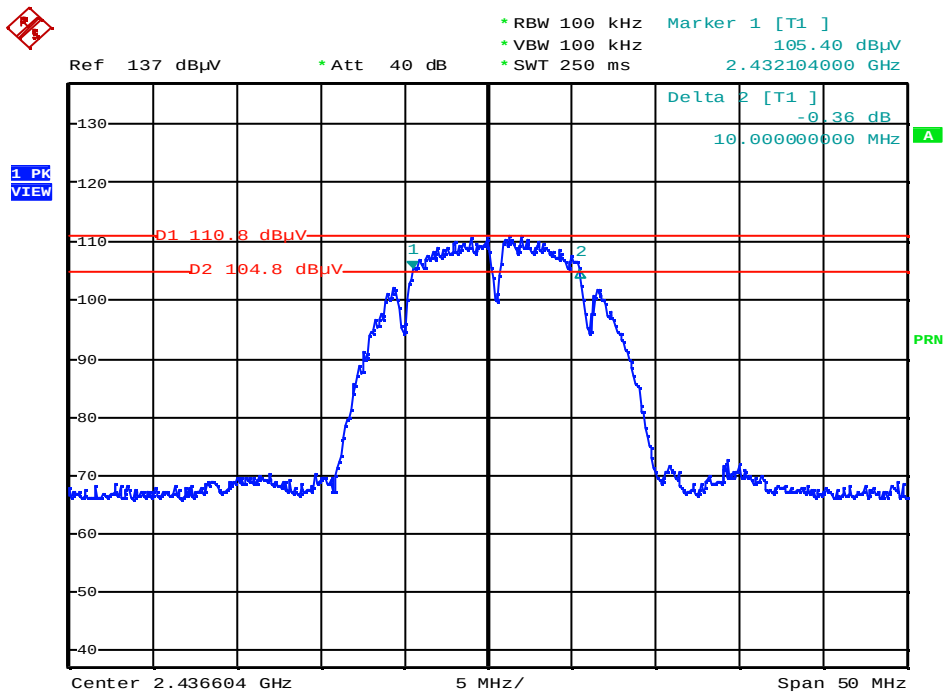
6.3 Spectrum Plot Data

IEEE 802.11b

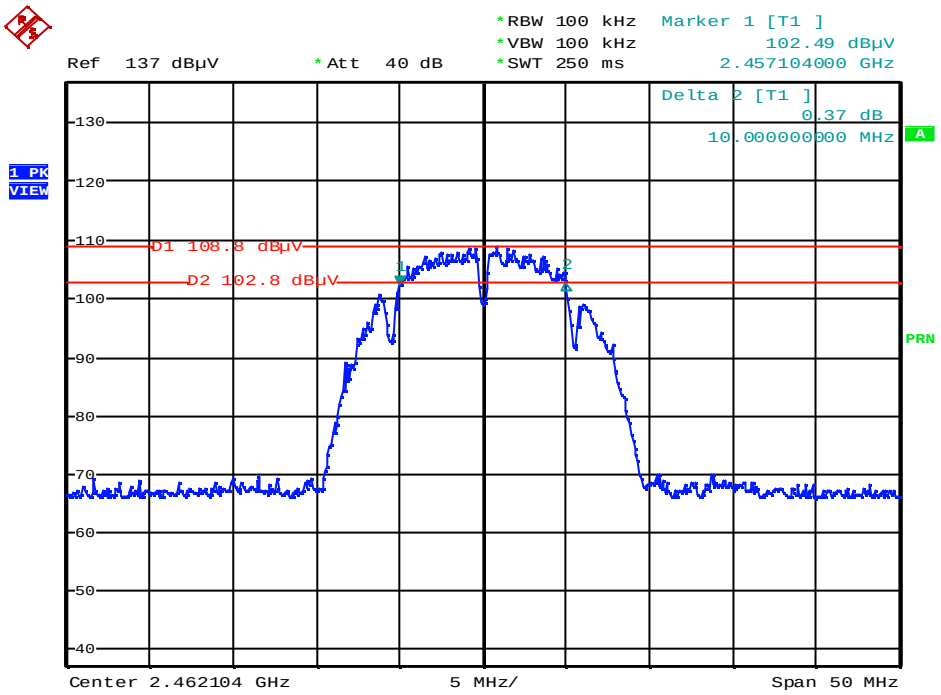
Channel No. : CH 1 (Low)
Data Rate: 11 Mbps



Channel No. : CH 6 (Mid)
Data Rate: 11 Mbps

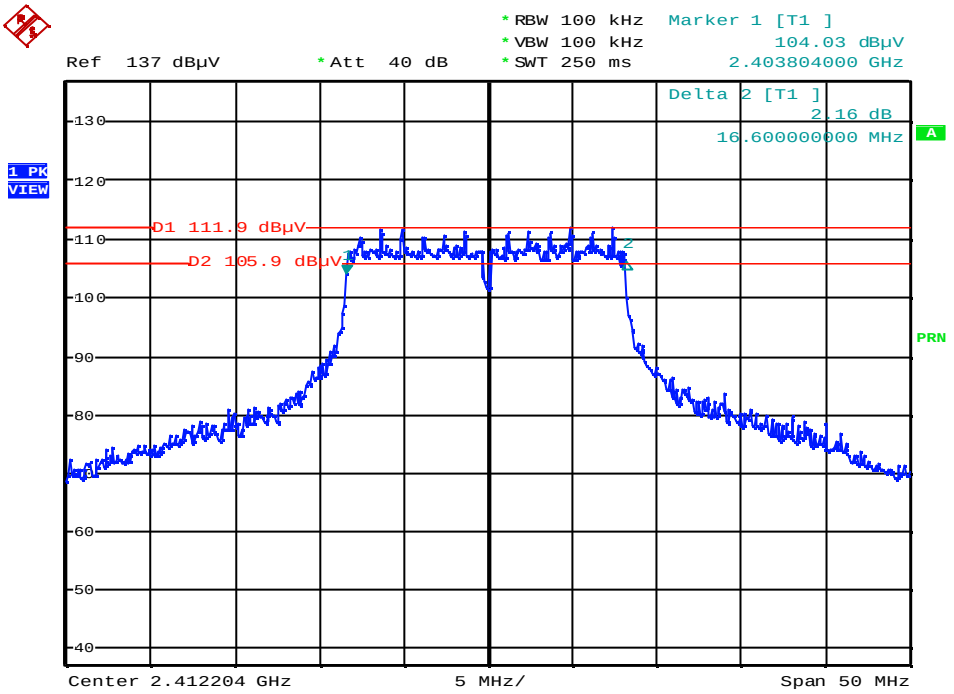


Channel No. : CH 11 (High)
Data Rate: 11 Mbps

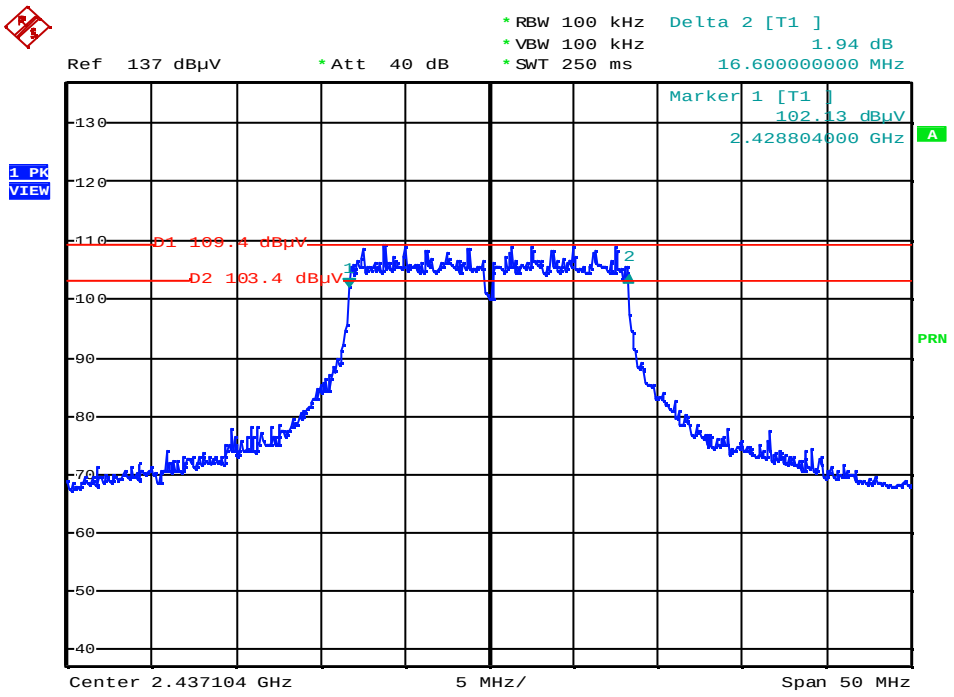


IEEE 802.11g

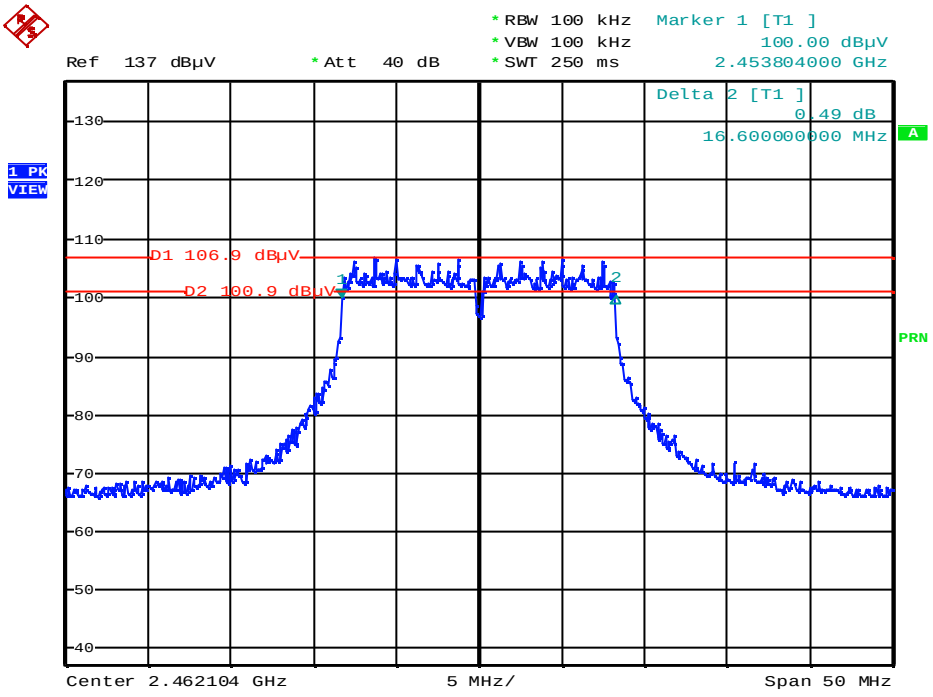
Channel No. : CH 1 (Low)
Data Rate: 54 Mbps



Channel No. : CH 6 (Mid)
Data Rate: 54 Mbps



Channel No. : CH 11 (High)
Data Rate: 54 Mbps



7. §15.247(b)(3): Maximum Peak Radiated Output Power

7.1 Test Method

§15.247 Measurement of Digital Transmission Systems. Alternative Test Procedures (1).

Temperature: **23** ℃ Humidity: **60** %

RBW=3MHz VBW=3MHz

SWT=Auto Test distance=3m

Limit <1 Watt

7.2 Test Result of Fundamental Emissions

For IEEE 802.11 b , we tested four data rate and the pre-scan results as below：

Data rate / result	A.P.	Spectrum read (dBμV/m)		
		Low CH1	Mid CH6	High CH11
1 Mbps	H	76.21	72.71	71.21
	V	64.31	60.13	59.20
2 Mbps	H	77.10	72.92	71.66
	V	65.54	61.59	60.81
5.5 Mbps	H	77.49	73.21	71.30
	V	66.21	61.40	61.21
11 Mbps	H	78.52	74.22	72.34
	V	67.13	62.99	61.80

For IEEE 802.11 b , the worst case (data rate 11Mbps) testing results summary as below：

Channel	A.P.	Frequency (GHz)	S.A. Read (dBμV/m)	C. L. (dB)	A. F. (dB)	E (dBμV/m)	E (V/m)	P (W)	Test Result
1	H	2.412	78.52	5.47	28.37	112.36	$414*10^{-3}$	$16*10^{-3}$	PASS
	V		67.13			100.97	$111*10^{-3}$	$1*10^{-3}$	PASS
6	H	2.437	74.22	5.51	28.38	108.11	$254*10^{-3}$	$6*10^{-3}$	PASS
	V		62.99			96.88	$69*10^{-3}$	$0.45*10^{-3}$	PASS
11	H	2.462	72.34	5.55	28.39	106.28	$206*10^{-3}$	$4*10^{-3}$	PASS
	V		61.80			95.74	$61*10^{-3}$	$0.35*10^{-3}$	PASS

For IEEE 802.11 g , we tested four data rate and the pre-scan results as below：

Data rate / result	A.P.	Spectrum read (dBμV/m)		
		Low CH1	Mid CH6	High CH11
6 Mbps	H	78.42	75.45	72.29
	V	66.49	63.03	62.96
9 Mbps	H	77.31	74.30	71.17
	V	65.19	62.73	61.53
12 Mbps	H	76.14	74.25	70.61
	V	66.10	62.14	61.23
18 Mbps	H	74.49	74.13	71.42
	V	65.93	61.93	60.90
24 Mbps	H	74.51	73.54	71.09
	V	64.72	61.44	61.13
36 Mbps	H	74.69	73.69	71.20
	V	65.21	62.11	61.05
48 Mbps	H	74.79	74.19	71.14
	V	65.43	61.94	60.12
54 Mbps	H	75.12	74.61	71.57
	V	65.75	62.37	60.32

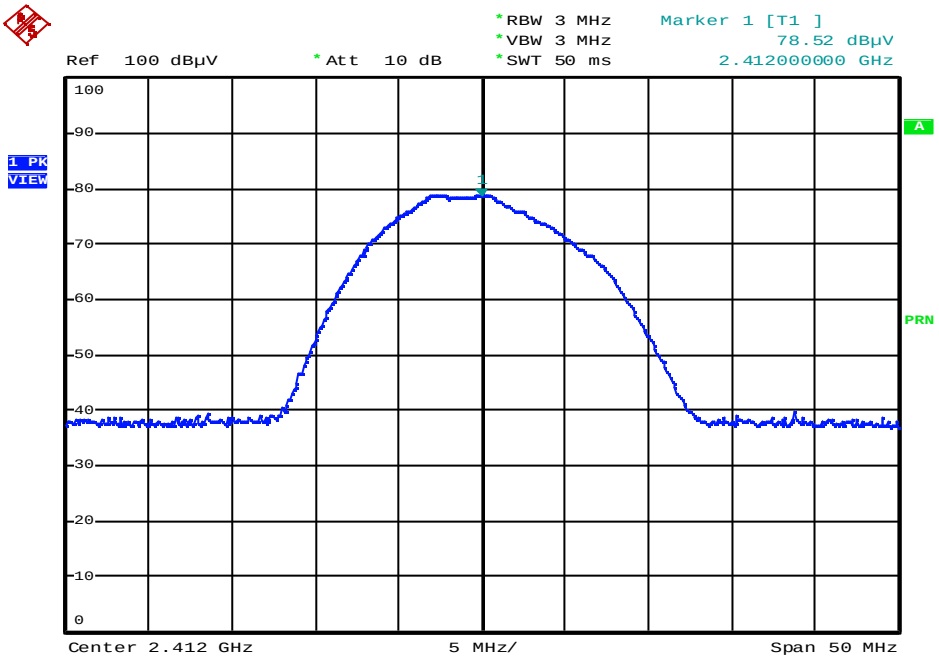
For IEEE 802.11 g , the worst case (data rate 6Mbps) testing results summary as below：

Channel	A.P.	Frequency (GHz)	S.A. Read (dBμV/m)	C. L. (dB)	A. F. (dB)	E (dBμV/m)	E (V/m)	P (W)	Test Result
1	H	2.412	78.42	5.47	28.37	112.26	$410*10^{-3}$	$15*10^{-3}$	PASS
	V		66.49			100.34	$103*10^{-3}$	$1*10^{-3}$	PASS
6	H	2.437	75.45	5.51	28.38	109.34	$293*10^{-3}$	$8*10^{-3}$	PASS
	V		63.03			96.92	$70*10^{-3}$	$0.46*10^{-3}$	PASS
11	H	2.462	72.29	5.55	28.39	106.23	$204*10^{-3}$	$3*10^{-3}$	PASS
	V		62.96			96.90	$69*10^{-3}$	$0.45*10^{-3}$	PASS

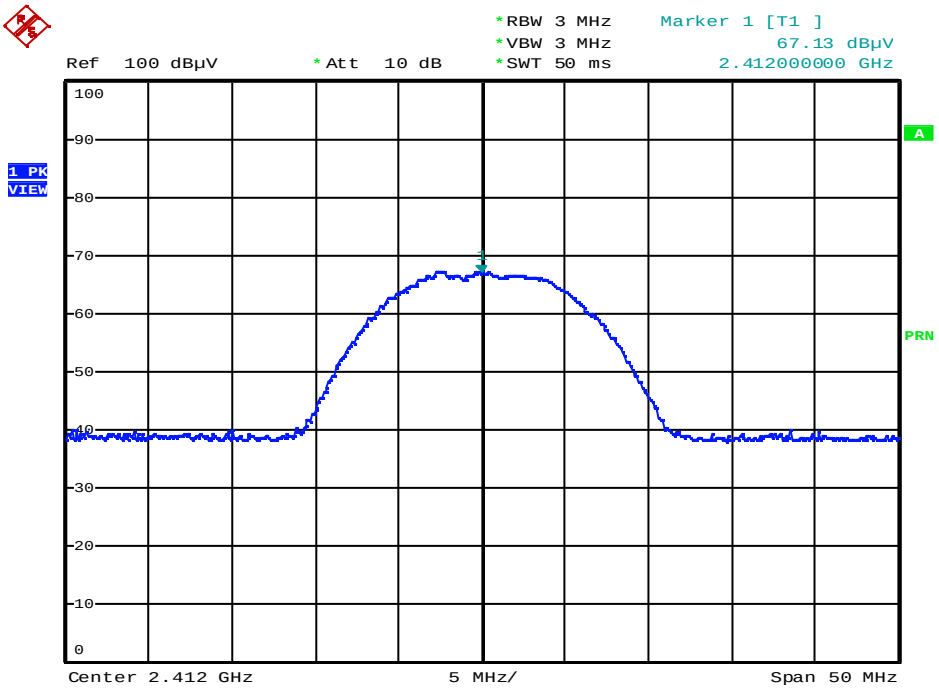
Note: “A.P.” means Antenna Polarization
“S.A.” Read” means Spectrum Analyzer Reading
“C.L.” means RF Cable Loss
“A.F.” means Antenna Factor
E = S.A Read + C.L. + A.F.
$P (W) = (E \times d)^2 / 30 \times G$
Where: E = the measured maximum field strength in V/m.
G = the numeric gain of the transmitting antenna over an isotropic radiator.
= 5 dBi = 3.16
d = the distance in meters from which the field strength was measured.
= 3m

7.3 Spectrum Plot Data
IEEE 802.11b

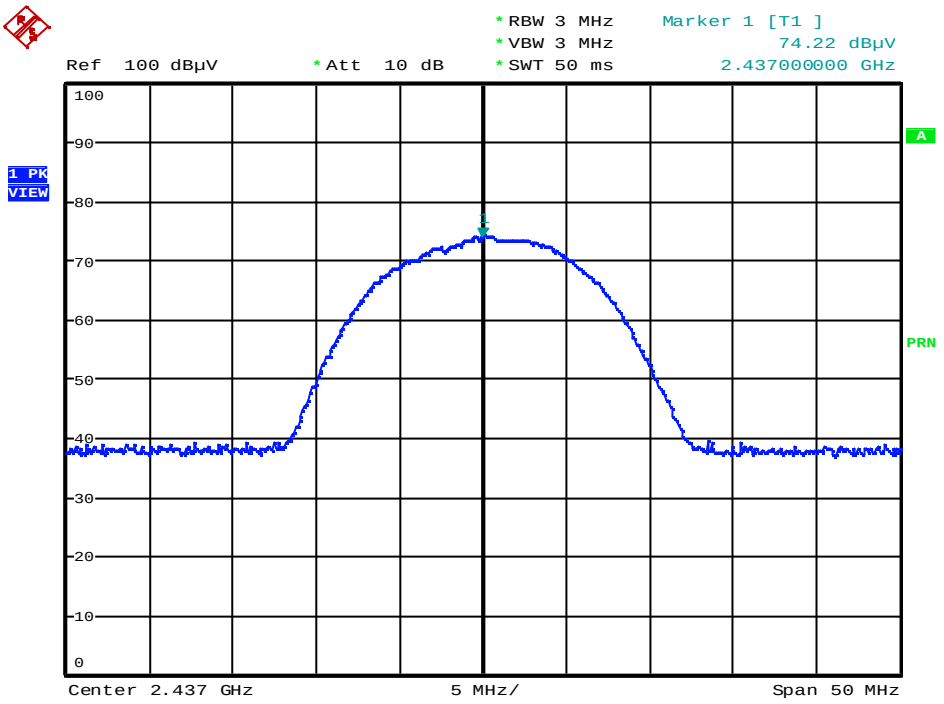
Channel No. : CH 1 (Low)
Data Rate: 11 Mbps
Horizontal



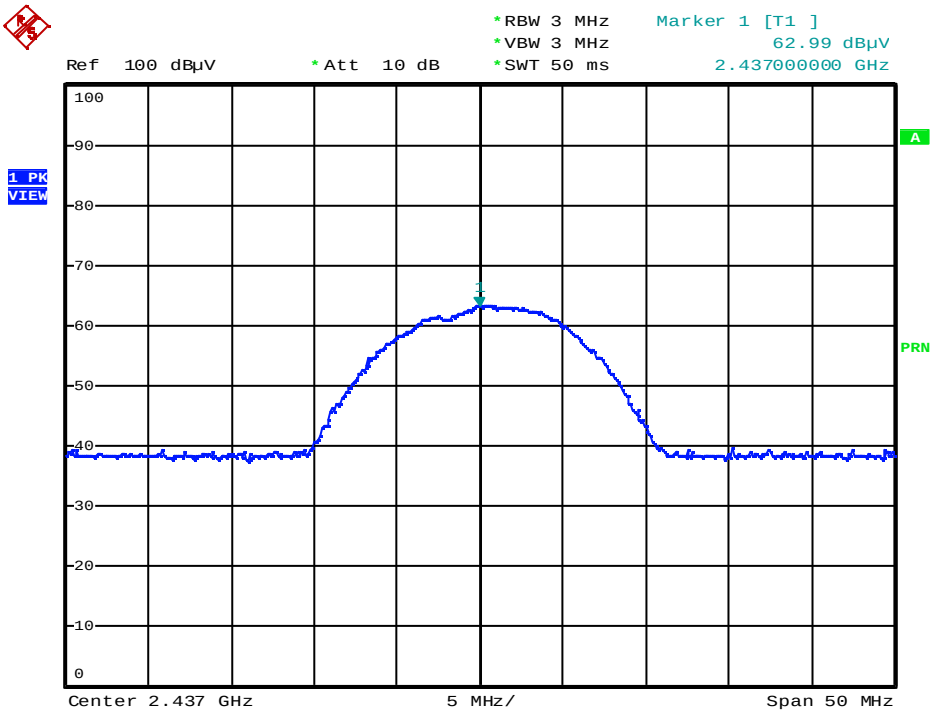
Vertical



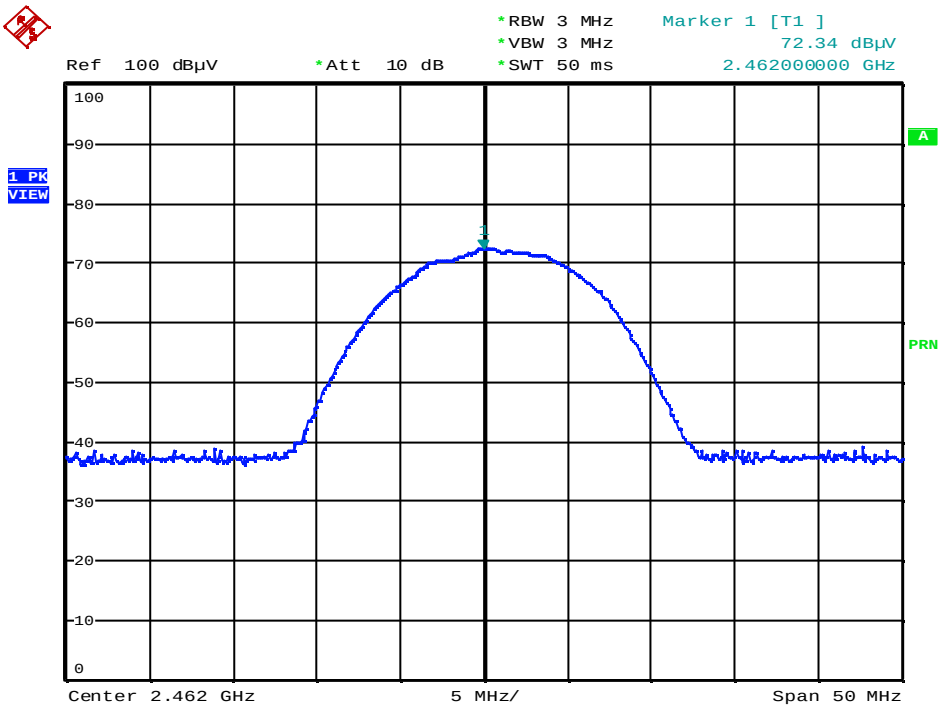
Channel No. : CH 6 (Mid)
Data Rate: 11 Mbps
Horizontal



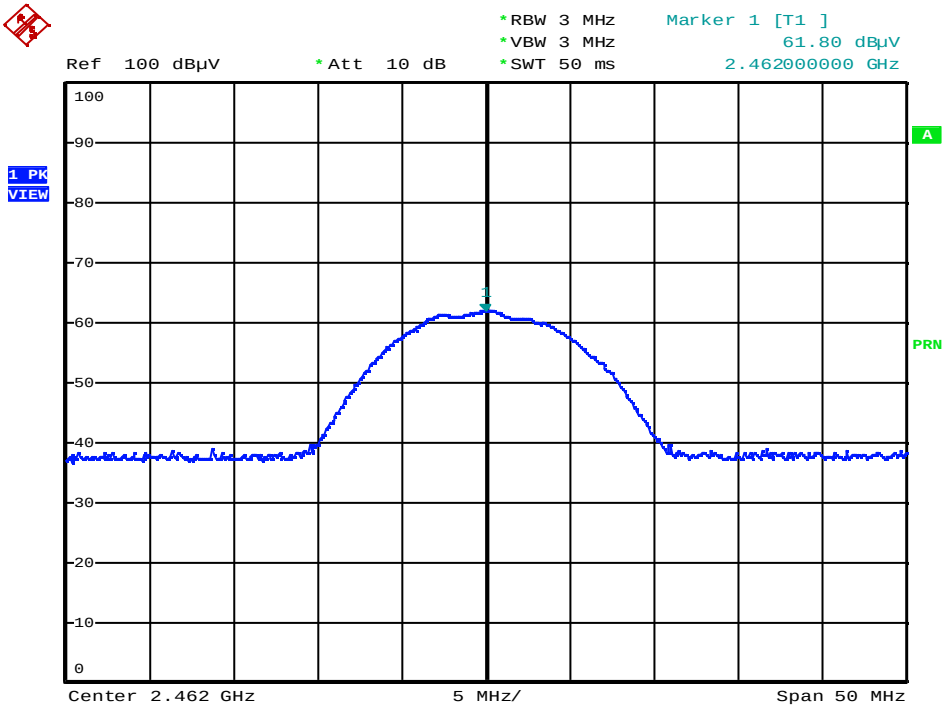
Vertical



Channel No. : CH 11 (High)
Data Rate: 11 Mbps
Horizontal

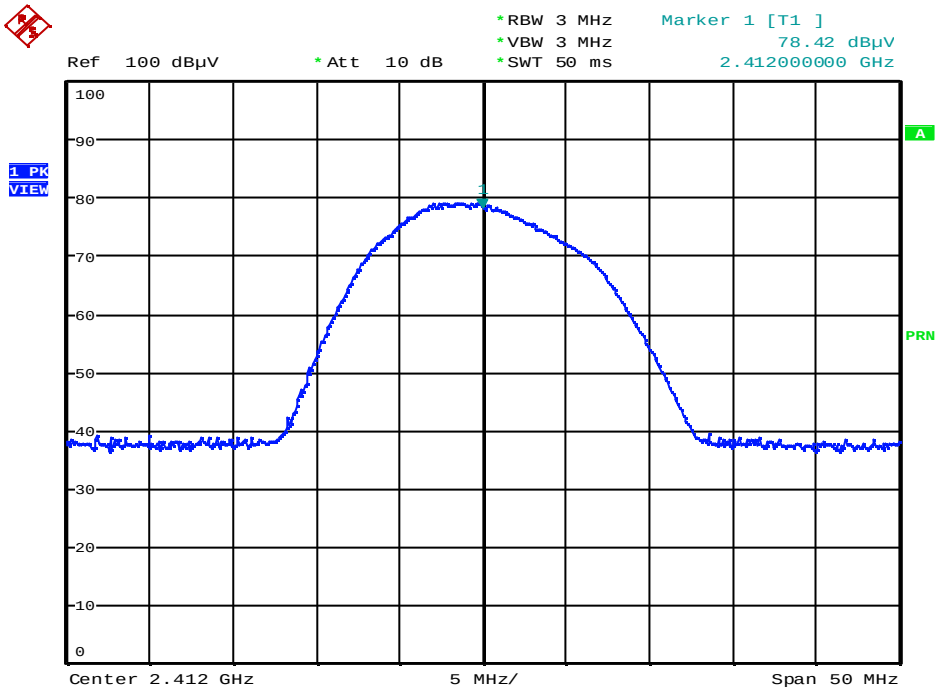


Vertical

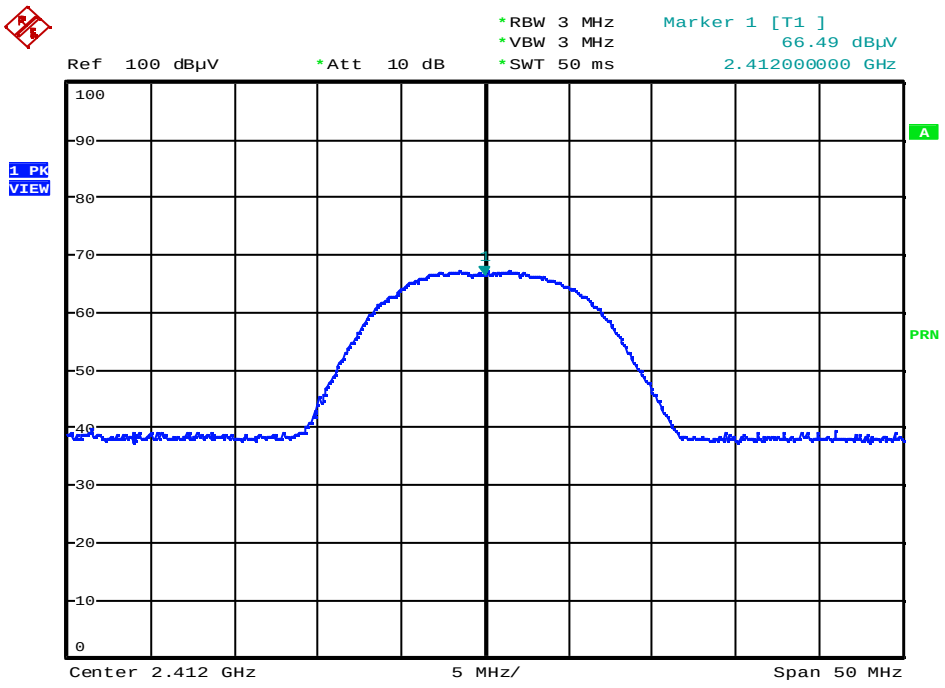


IEEE 802.11g

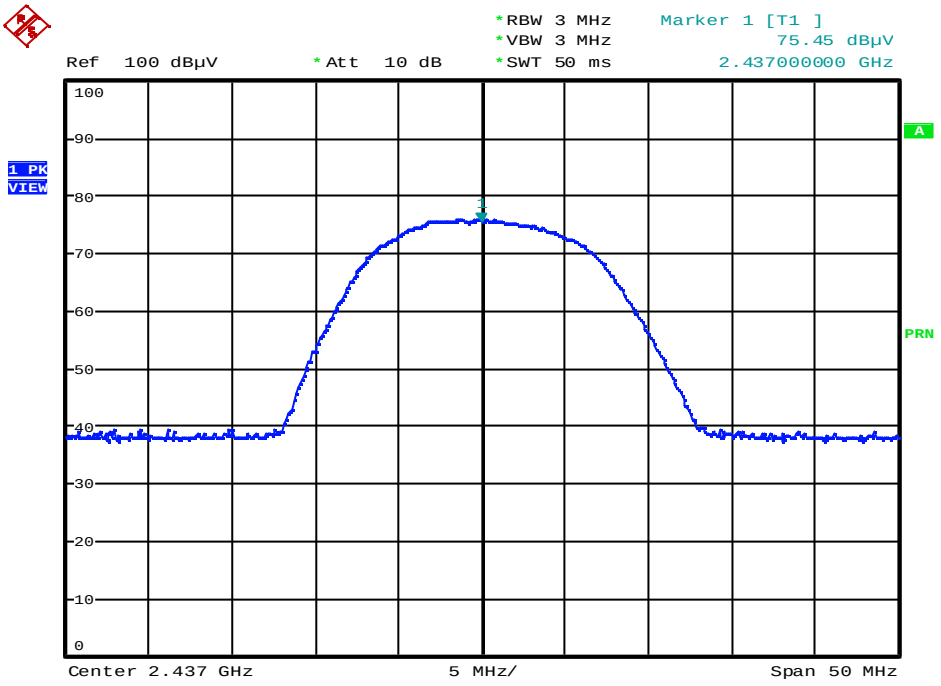
Channel No. : CH 1 (Low)
Data Rate: 6 Mbps
Horizontal



Vertical



Channel No. : CH 6 (Mid)
Data Rate: 6 Mbps
Horizontal



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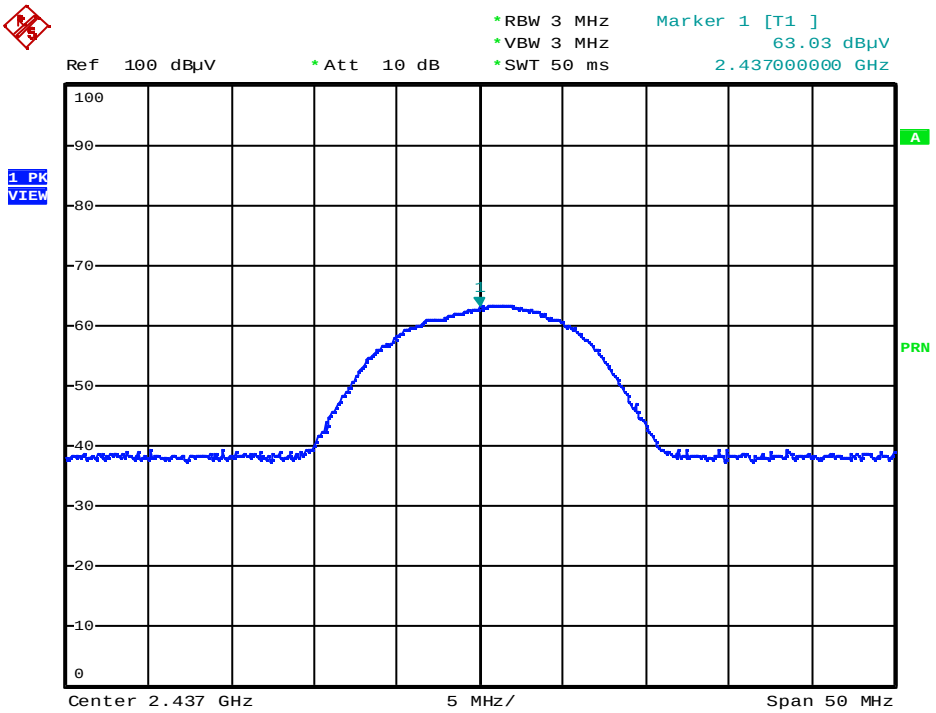
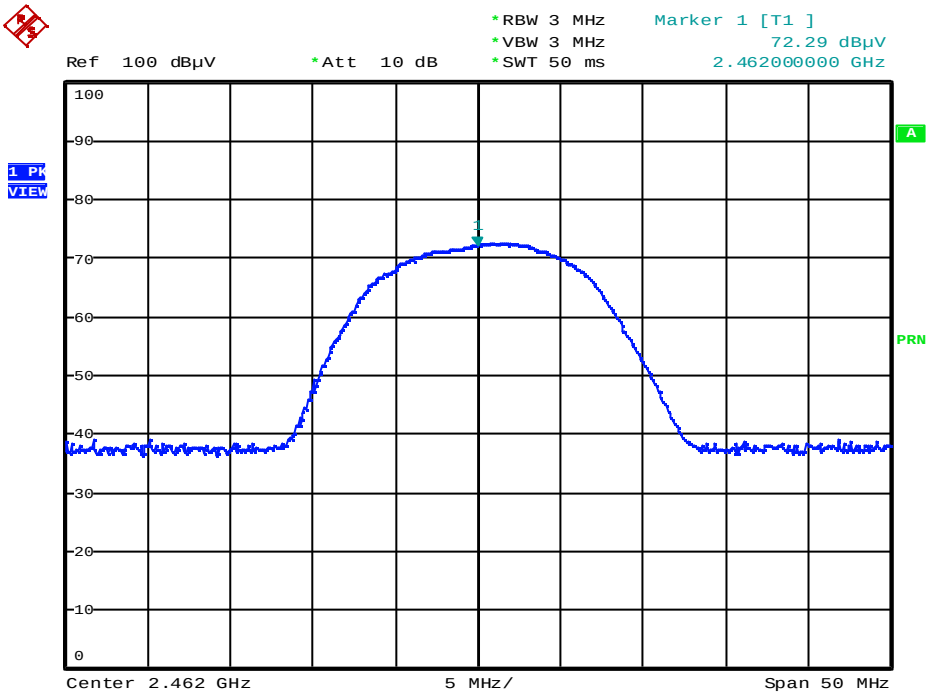


Channel No. : CH 11 (High)
Data Rate: 6 Mbps
Horizontal



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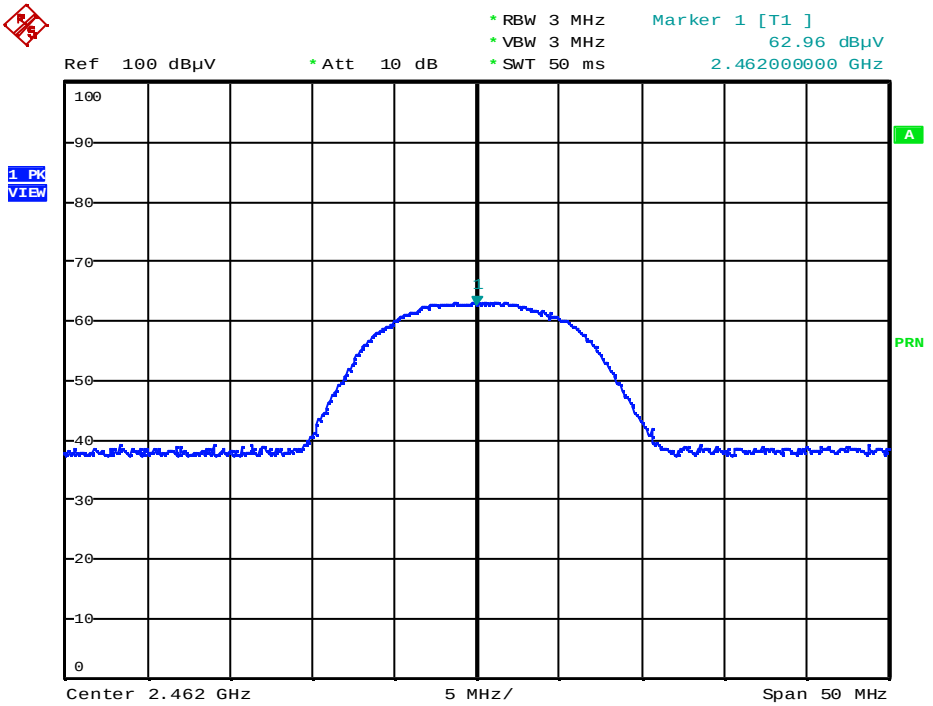
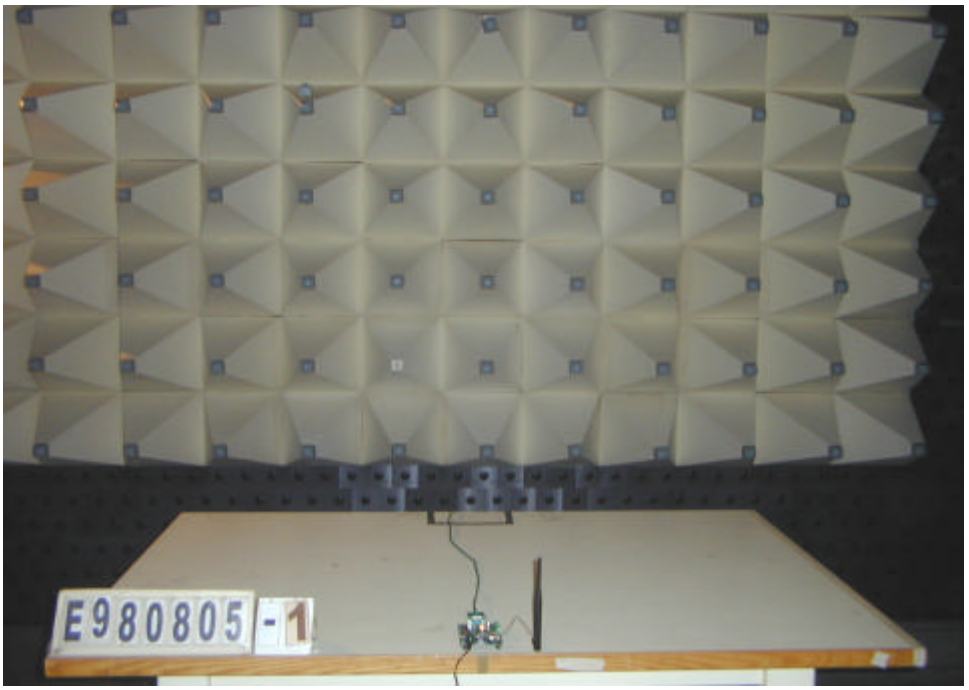


7.4 Test Setup Photo



8. §15.247(d): 100KHz Outside Band Test

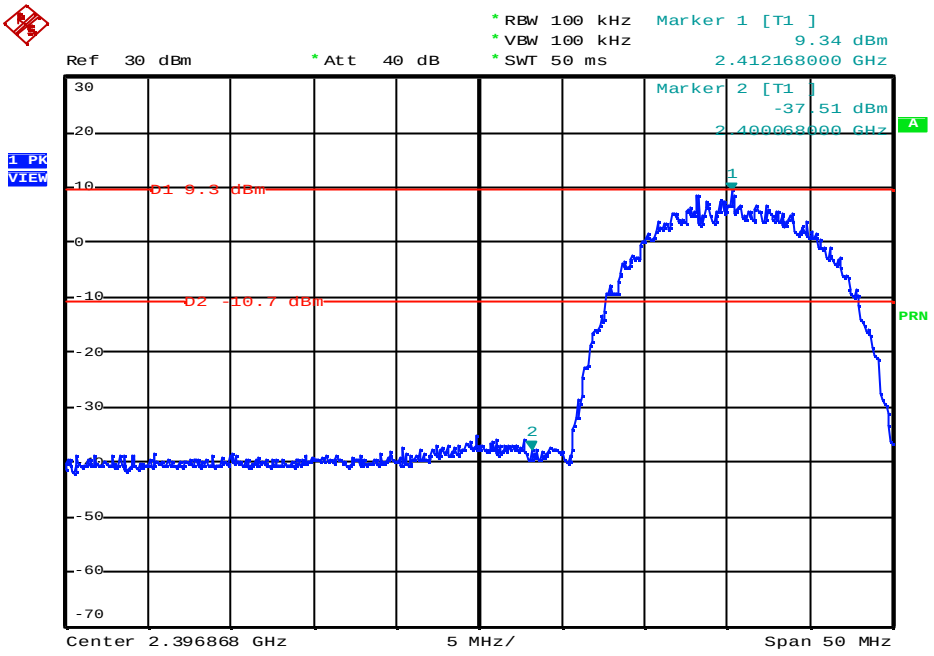
8.1 Band Edge Measurement

IEEE 802.11b			
Data rate / result	**Channel**		
	Low CH1	**Mid CH6**	**High CH11**
1 Mbps	Pass	N/A	Pass
2 Mbps	Pass	N/A	Pass
5.5 Mbps	Pass	N/A	Pass
11 Mbps	Pass	N/A	Pass

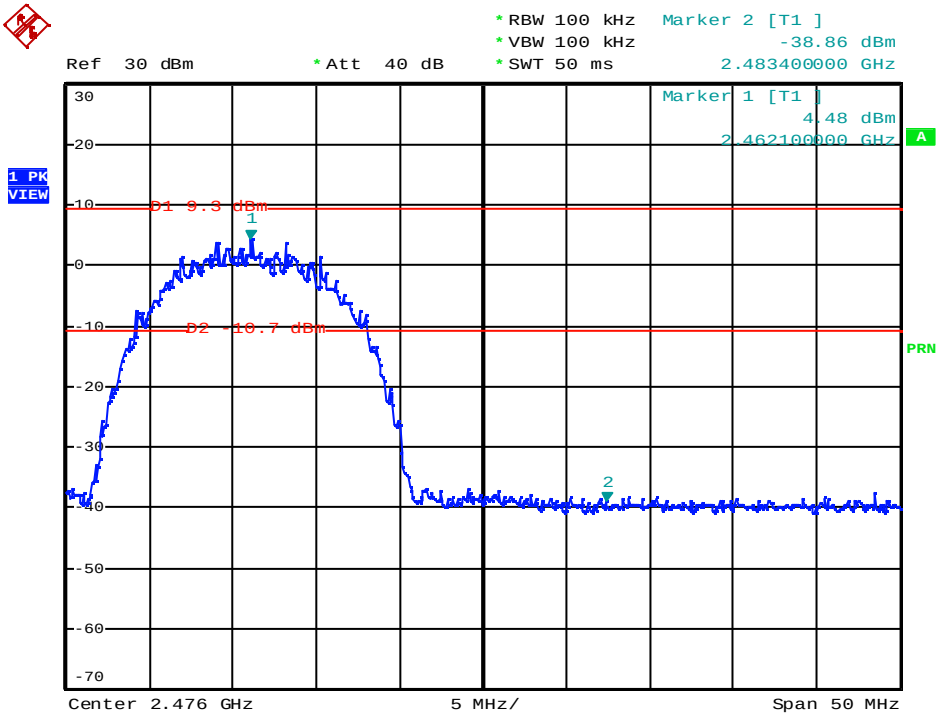
IEEE 802.11g			
Data rate / result	**Channel**		
	Low CH1	**Mid CH6**	**High CH11**
6 Mbps	Pass	N/A	Pass
9 Mbps	Pass	N/A	Pass
12 Mbps	Pass	N/A	Pass
18 Mbps	Pass	N/A	Pass
24 Mbps	Pass	N/A	Pass
36 Mbps	Pass	N/A	Pass
48 Mbps	Pass	N/A	Pass
54 Mbps	Pass	N/A	Pass

IEEE 802.11b Test Data

Channel No. : CH 1 (Low)
Data Rate: 11 Mbps

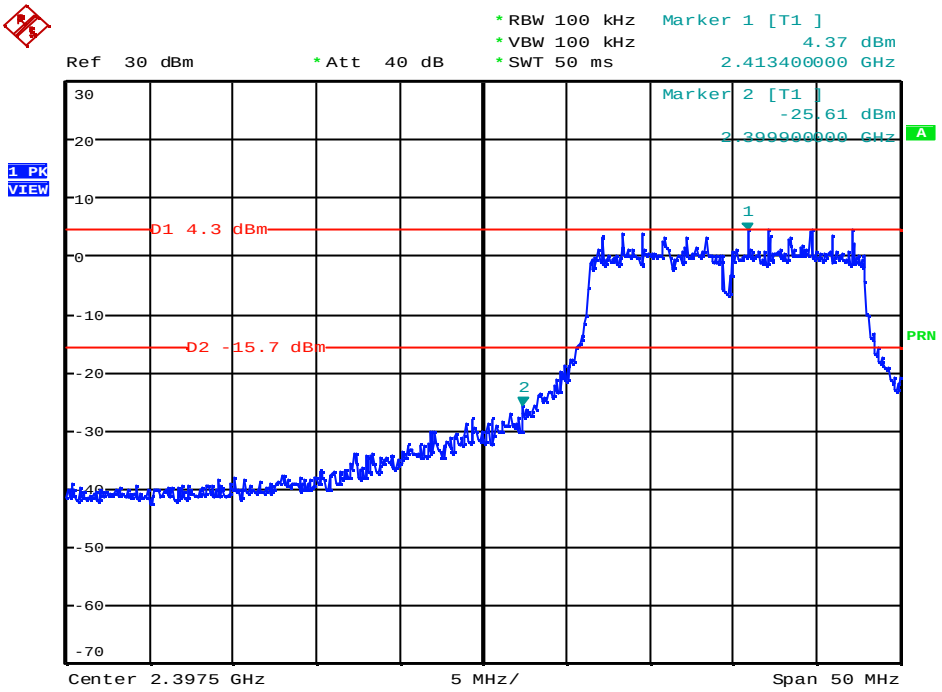


Channel No. : CH 11 (High)
Data Rate: 11 Mbps

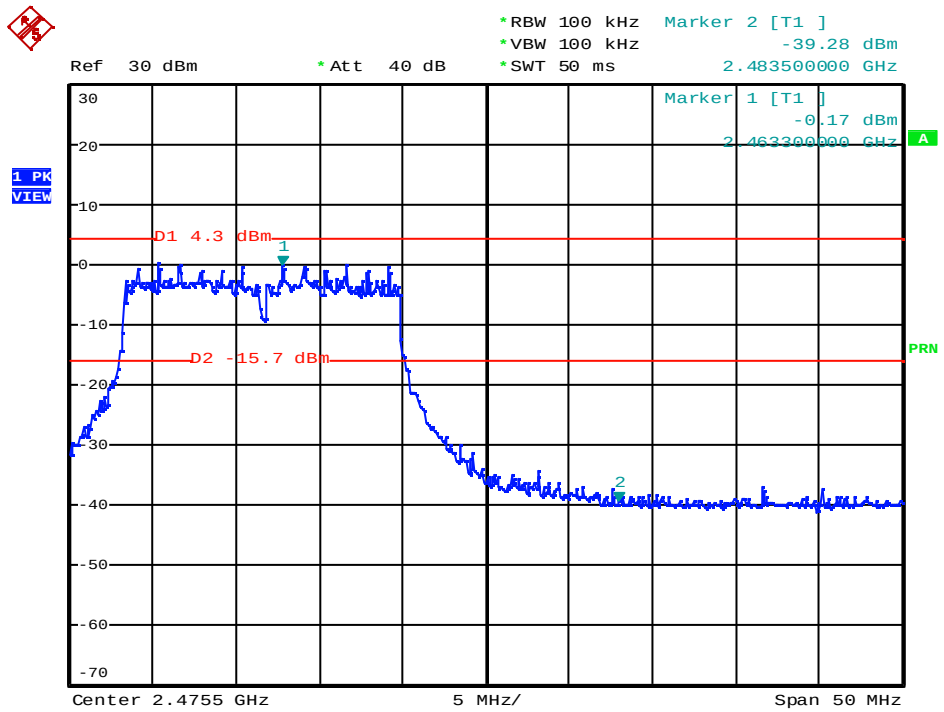


IEEE 802.11g Test Data

Channel No. : CH 1 (Low)
Data Rate: 54 Mbps



Channel No. : CH 11 (High)
Data Rate: 54 Mbps

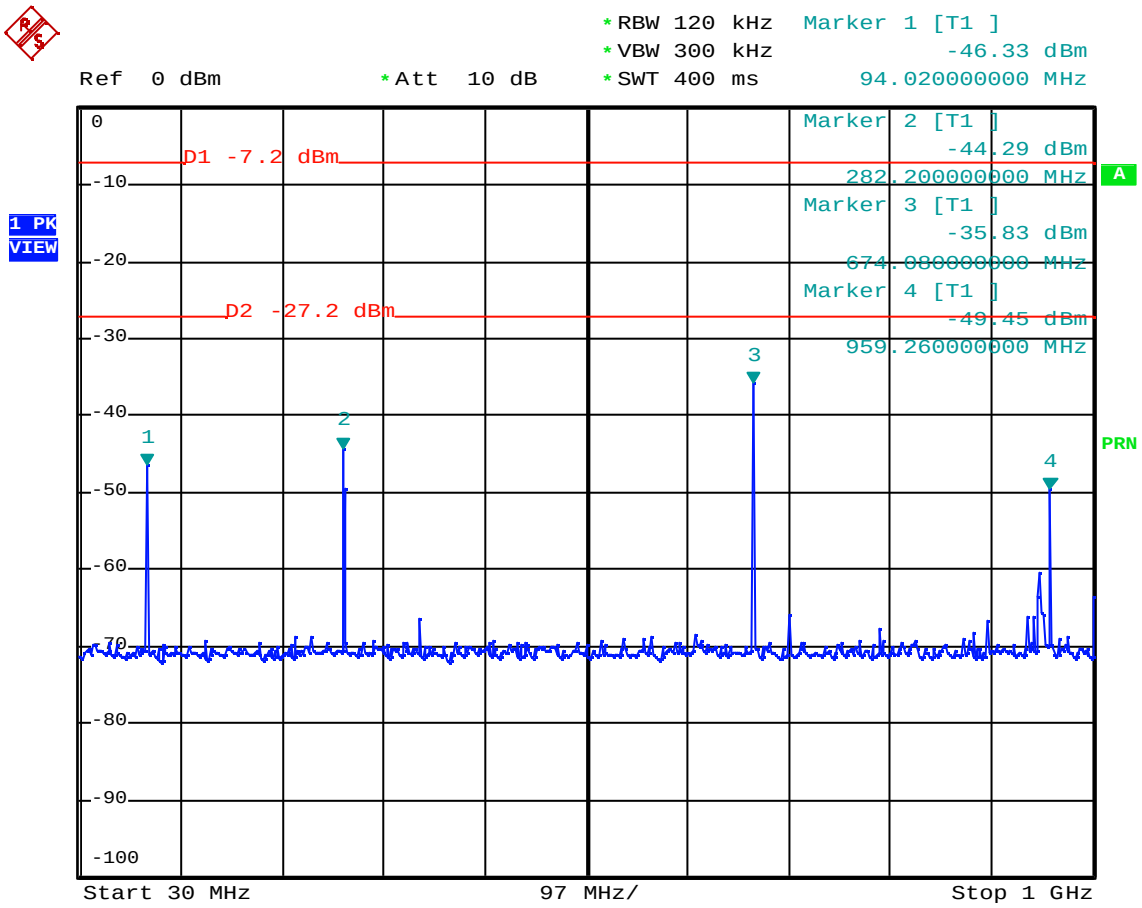


8.2 Spurious Conducted Emissions

Test Results:

Model No.	**: GA1000**		
Frequency range	**: 30MHz to 1GHz**	**Detector**	**: Peak Value**
Temperature	**: 28 ℃**	**Humidity**	**: 55 %**

The highest value: 94.02MHz / -46.33dBm < -27.2dBm

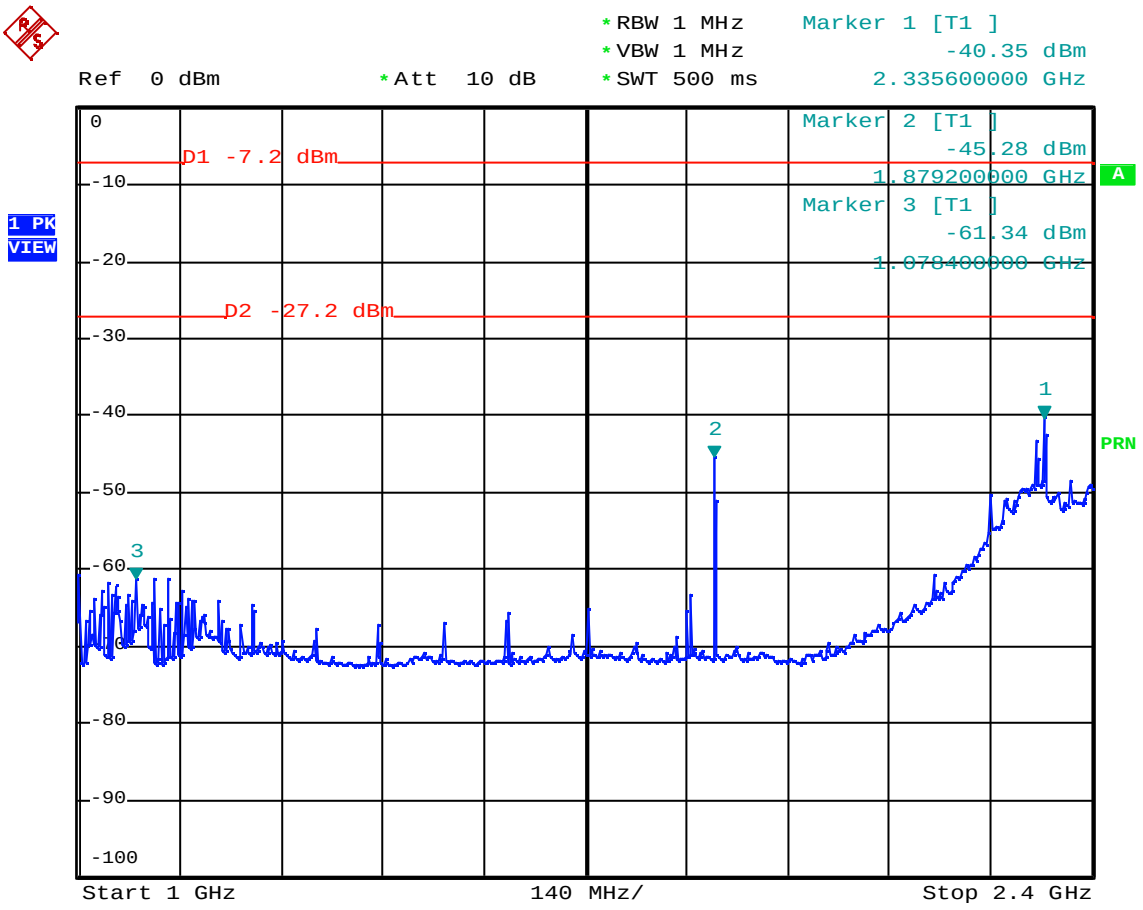


Test Results:

Model No.	**: GA1000**		
Frequency range	**: 1GHz to 2.4GHz**	**Detector**	**: Peak Value**
Temperature	**: 28 ℃**	**Humidity**	**: 55 %**

The highest value: 2.3356GHz / -40.35dBm < -27.2dBm

1.8792GHz / -45.28dBm < -27.2dBm

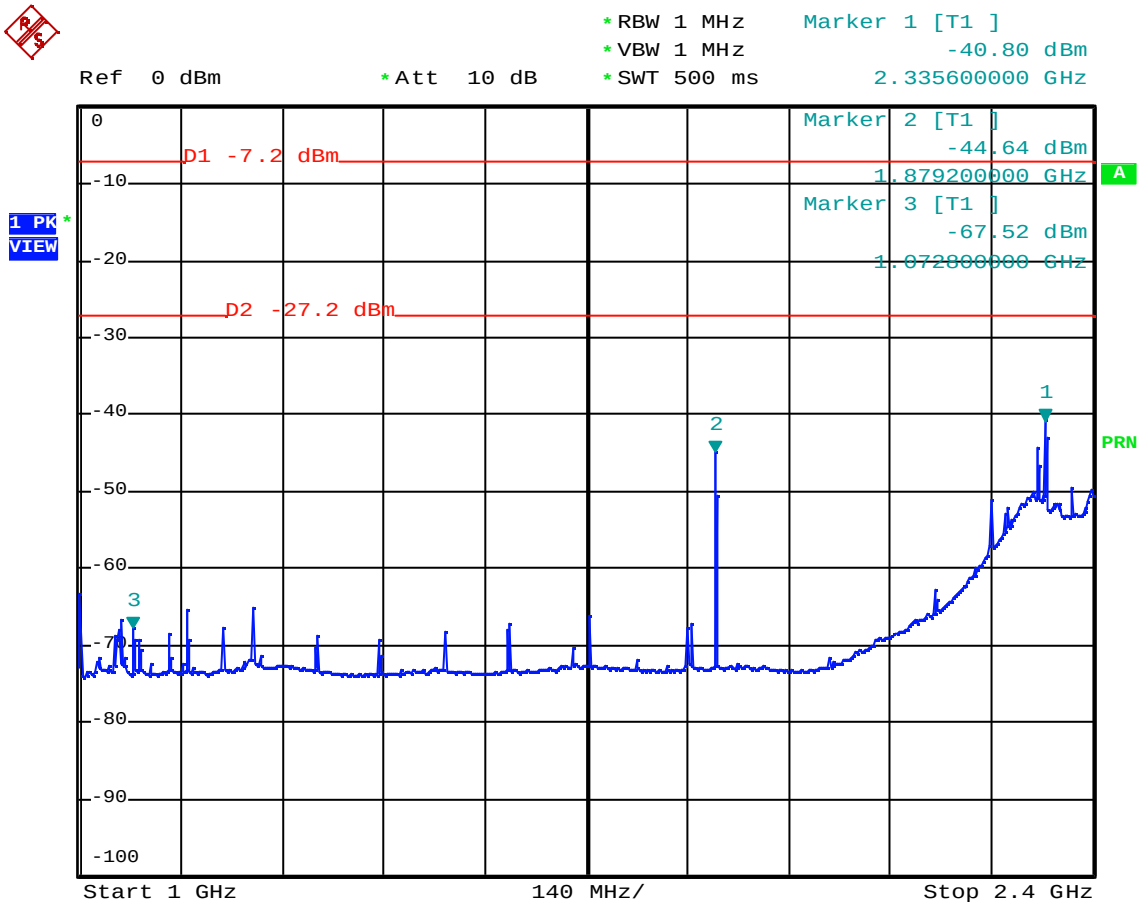


Test Results:

Model No.	**: GA1000**		
Frequency range	**: 1GHz to 2.4GHz**	**Detector**	**: Average Value**
Temperature	**: 28 ℃**	**Humidity**	**: 55 %**

The highest value: 2.3356GHz / -40.80dBm < -27.2dBm

1.8792GHz / -44.64dBm < -27.2dBm

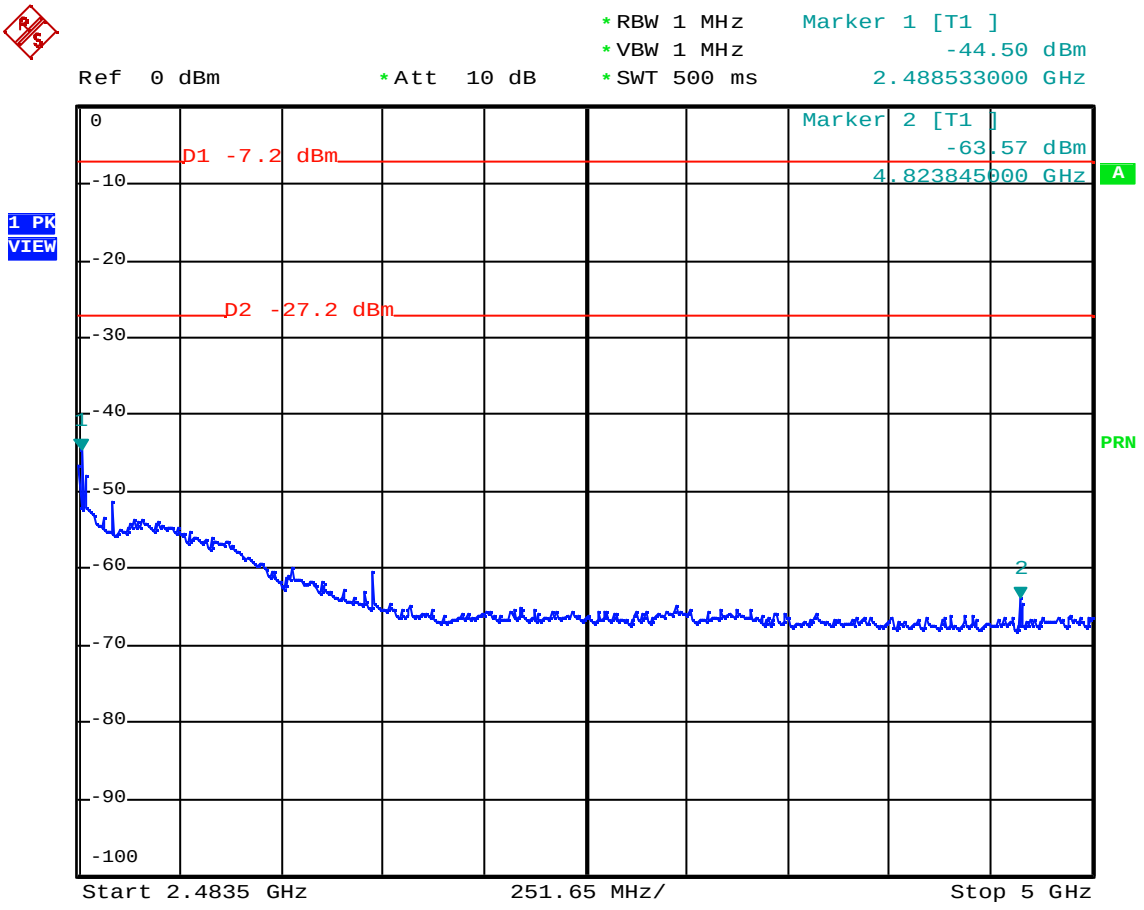


Test Results:

Model No.	**: GA1000**		
Frequency range	**: 2.4835GHz to 5GHz**	**Detector**	**: Peak Value**
Temperature	**: 28 ℃**	**Humidity**	**: 55 %**

The highest value: 2.488533GHz / -44.50dBm < -27.2dBm

4.823845GHz / -63.57dBm < -27.2dBm

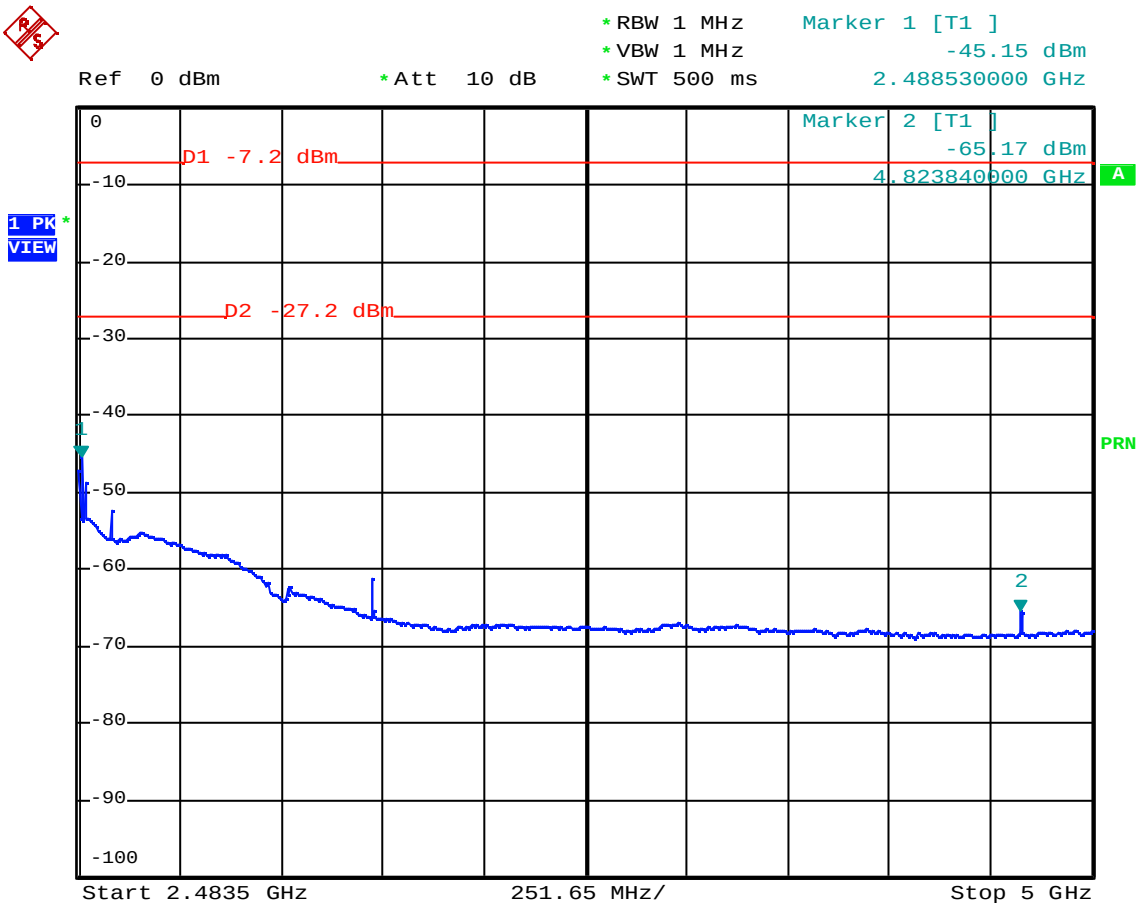


Test Results:

Model No.	**: GA1000**		
Frequency range	**: 2.4835GHz to 5GHz**	**Detector**	**: Average Value**
Temperature	**: 28 ℃**	**Humidity**	**: 55 %**

The highest value: 2.48853GHz / -45.15dBm < -27.2dBm

4.82384GHz / -65.17dBm < -27.2dBm

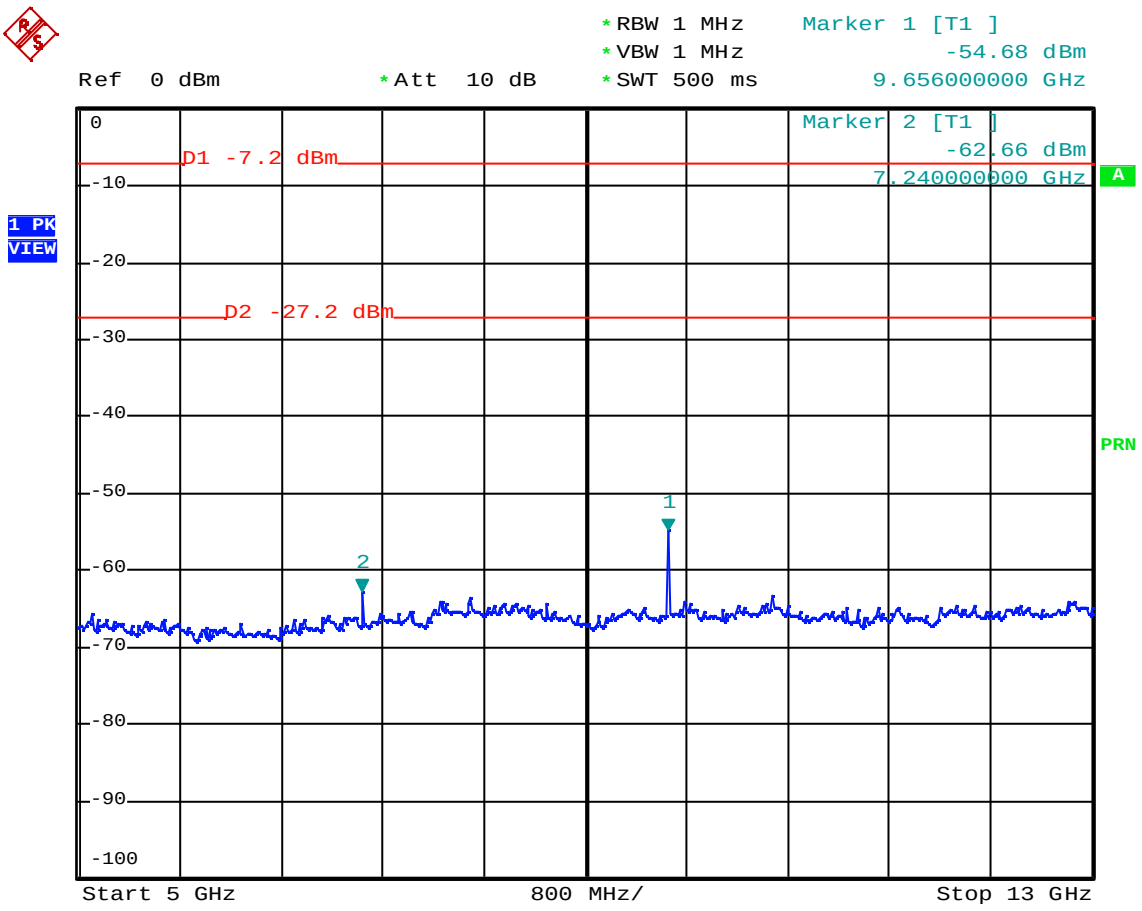


Test Results:

Model No.	**: GA1000**		
Frequency range	**: 5GHz to 13GHz**	**Detector**	**: Peak Value**
Temperature	**: 28 ℃**	**Humidity**	**: 55 %**

The highest value: 9.656GHz / -54.68dBm < -27.2dBm

7.240GHz / -62.66dBm < -27.2dBm

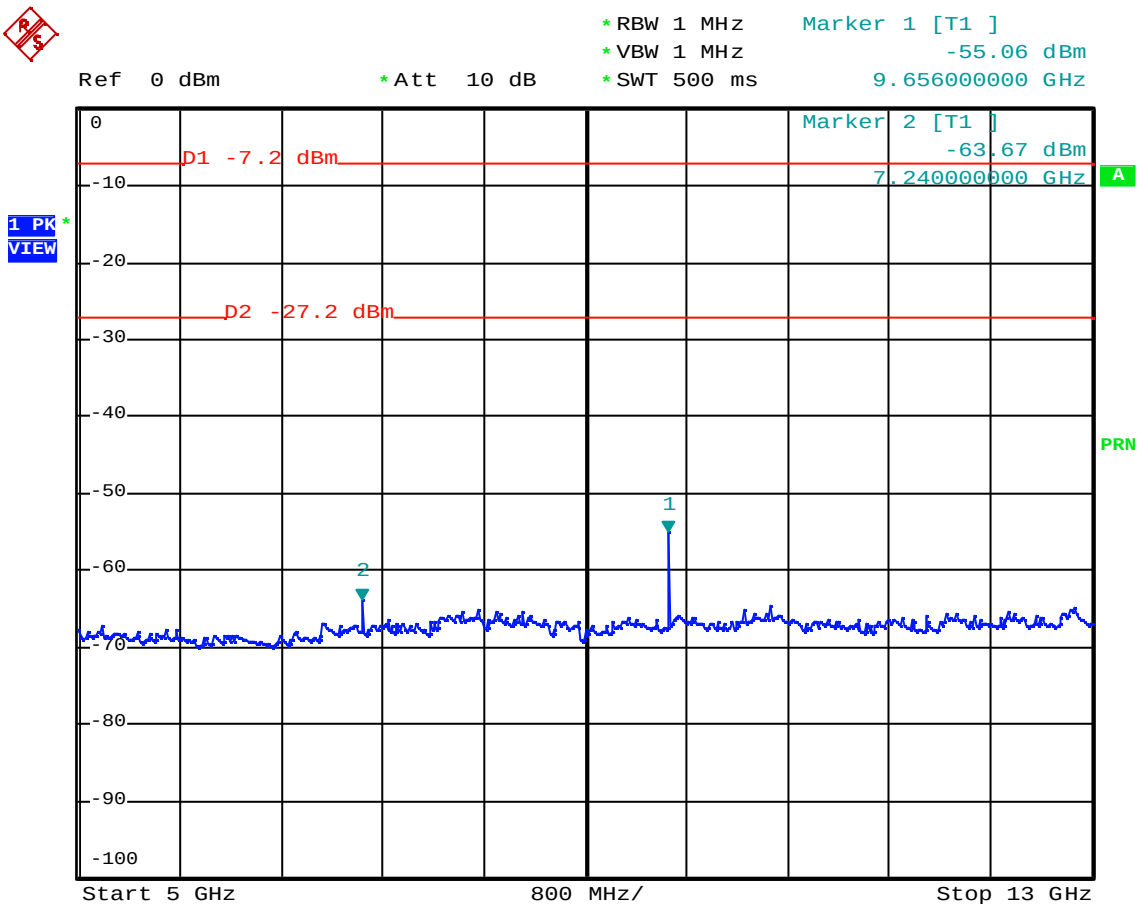


Test Results:

Model No.	**: GA1000**		
Frequency range	**: 5GHz to 13GHz**	**Detector**	**: Average Value**
Temperature	**: 28 ℃**	**Humidity**	**: 55 %**

The highest value: 9.656GHz / -55.06dBm < -27.2dBm

7.240GHz / -63.67dBm < -27.2dBm

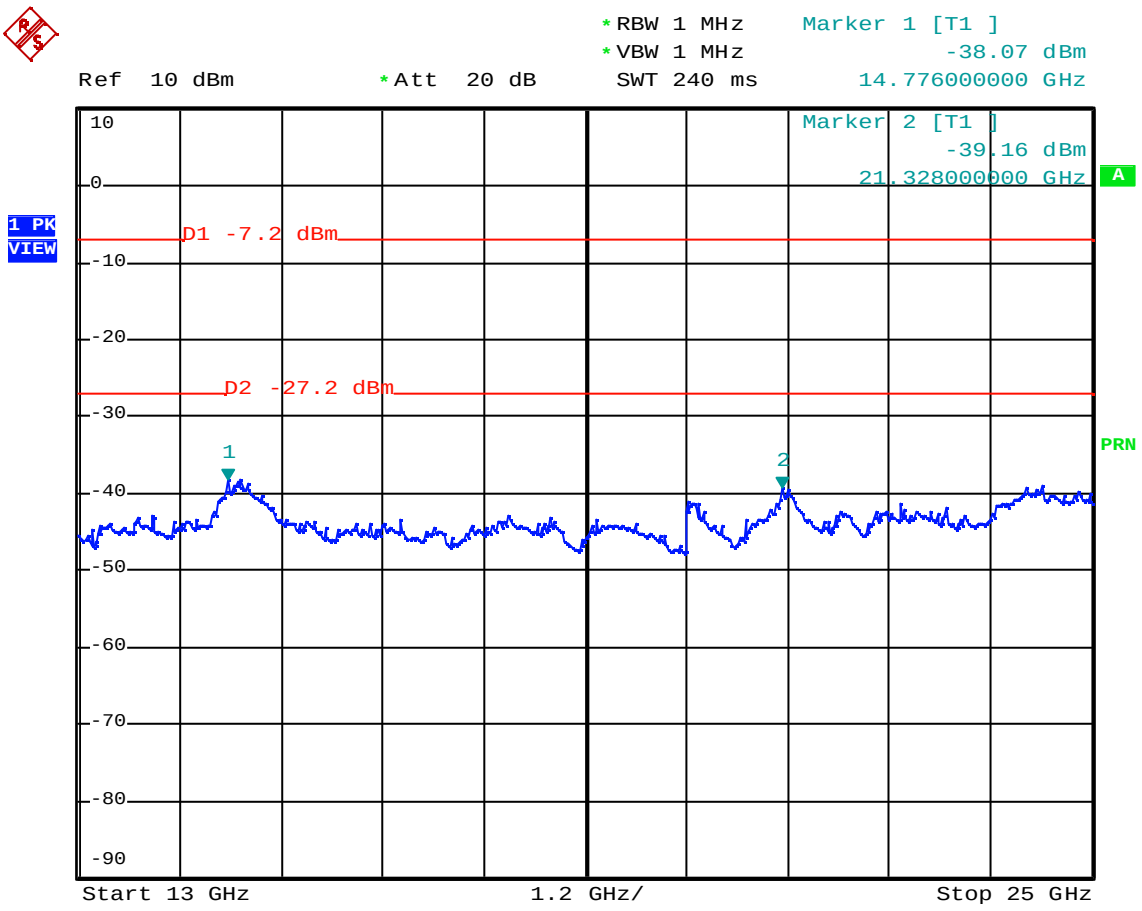


Test Results:

Model No.	**: GA1000**		
Frequency range	**: 13GHz to 25GHz**	**Detector**	**: Peak Value**
Temperature	**: 28 ℃**	**Humidity**	**: 55 %**

The highest value: 14.776GHz / -38.07dBm < -27.2dBm

21.328GHz / -39.16dBm < -27.2dBm

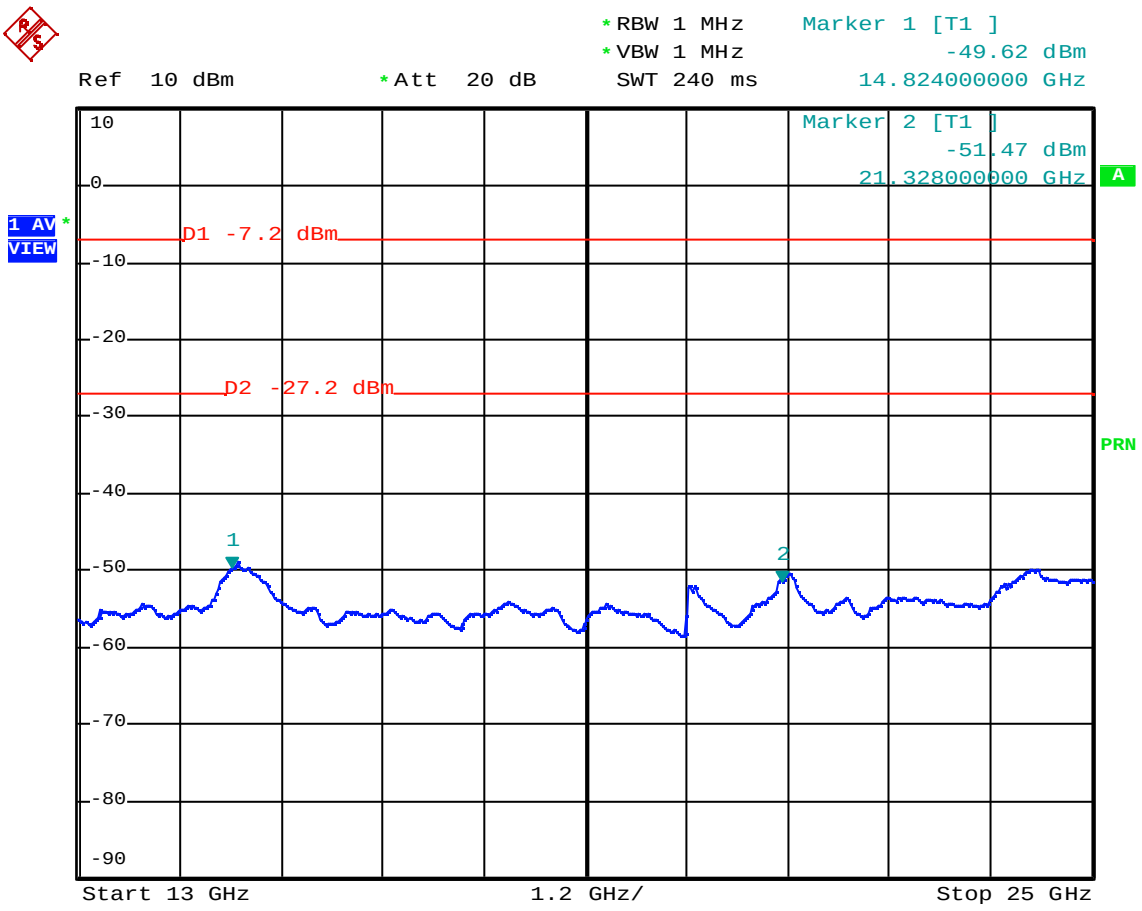


Test Results:

Model No.	**: GA1000**		
Frequency range	**: 13GHz to 25GHz**	**Detector**	**: Average Value**
Temperature	**: 28 ℃**	**Humidity**	**: 55 %**

The highest value: 14.824GHz / -49.62dBm < -27.2dBm

21.328GHz / -51.47dBm < -27.2dBm



8.3 Spurious Radiated Emissions

Test method:

According to ANSI C63.4 (2003) paragraph 10.1.8.2, we indicate three highest spurious and three restrict band emission relative to the limit, as result.

When we performed “Spurious Radiated Emission”, the EUT was under continuous transmitting condition. It means the channel will transmit energy channel by channel, sequentially. Then the worst case data can be detected, we don’t set F_L, F_M, F_H under test.

To avoid the pre-amplifier saturation by fundamental frequency, we added a “natch filter” (bandwidth from 2.4GHz to 2.4835GHz) between receiving antenna RF output and pre-amplifier’s RF input to bypass fundamental frequency , only detected spurious emission , and provide the worst result in this report .

Test result:

Measurement Range: 30MHz~25GHz Data rate：54Mbps

Resolution Bandwidth: 30MHz~1GHz, RBW=120KHz

Above 1GHz, RBW=1MHz

Temperature: **26** ℃ Humidity: **53** %

Antenna polarization: HORIZONTAL ; Test distance : 3m ;

Freq. (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Preamp Factor (dB)	Cable Loss (dB)	Antenna Factor (dB)	Detector Mode
2001.00	45.04	-54.96	100.00	44.42	32.41	4.83	28.20	Peak
2001.00	35.81	-44.19	80.00	35.19	32.41	4.83	28.20	Average
7232.00	54.65	-45.35	100.00	40.02	32.66	9.10	38.19	Peak
7232.00	43.27	-36.73	80.00	28.64	32.66	9.10	38.19	Average
9648.00	56.98	-43.02	100.00	40.09	32.70	9.93	39.66	Peak
9648.00	46.54	-33.46	80.00	29.65	32.70	9.93	39.66	Average
				Restrict Band				
1142.80	48.65	-25.35	74.00	52.38	31.99	3.44	24.82	Peak
1142.80	32.61	-21.39	54.00	36.34	31.99	3.44	24.82	Average
4823.85	47.31	-26.69	74.00	40.04	33.20	7.97	32.50	Peak
4826.36	45.64	- 8.36	54.00	38.36	33.20	7.97	32.51	Average
12056.00	58.12	-15.88	74.00	40.89	33.01	10.52	39.72	Peak
12056.00	47.05	- 6.95	54.00	29.82	33.01	10.52	39.72	Average

Antenna polarization: VERTICAL ; Test distance : 3m ;

Freq. (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Preamp Factor (dB)	Cable Loss (dB)	Antenna Factor (dB)	Detector Mode
2611.84	46.11	-53.89	100.00	44.60	32.97	5.72	28.76	Peak
2611.84	37.93	-42.07	80.00	36.42	32.97	5.72	28.76	Average
7232.00	55.70	-44.30	100.00	41.07	32.66	9.10	38.19	Peak
7232.00	43.27	-36.73	80.00	28.64	32.66	9.10	38.19	Average
9648.00	57.64	-42.36	100.00	40.75	32.70	9.93	39.66	Peak
9648.00	46.63	-33.37	80.00	29.74	32.70	9.93	39.66	Average
				Restrict Band				
1198.80	43.80	-30.20	74.00	47.43	32.03	3.53	24.87	Peak
1198.80	33.87	-20.13	54.00	37.50	32.03	3.53	24.87	Average
4823.85	47.39	-26.61	74.00	40.12	33.20	7.97	32.50	Peak
4823.85	45.36	- 8.64	54.00	38.09	33.20	7.97	32.50	Average
12056.00	58.64	-15.36	74.00	41.41	33.01	10.52	39.72	Peak
12056.00	47.21	- 6.79	54.00	29.98	33.01	10.52	39.72	Average

Note: If the Peak level under Average limit, the Average detector will not be perform.

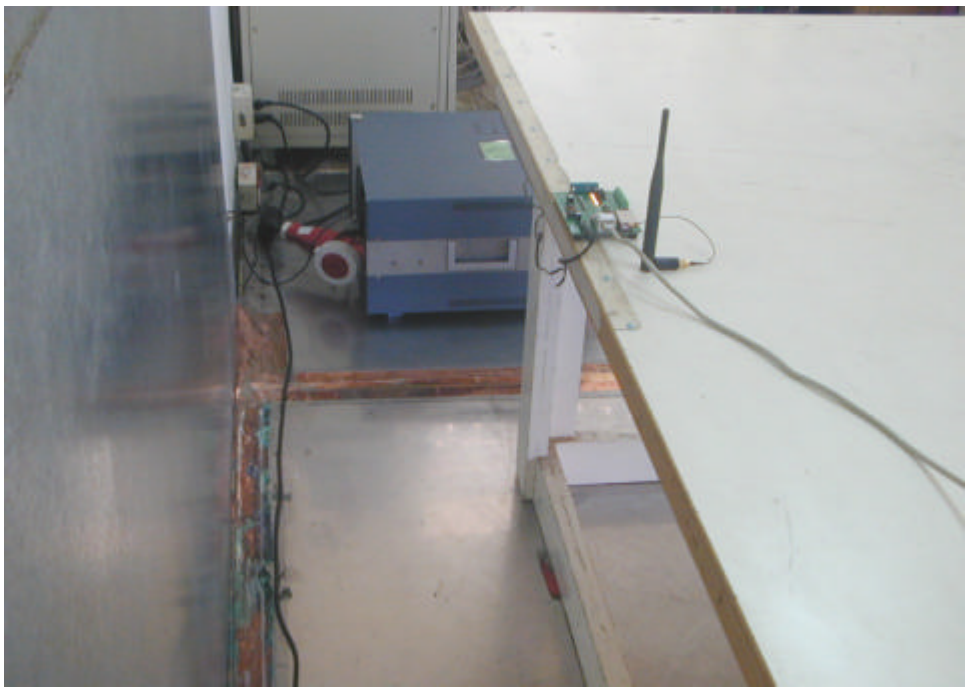
8.4 150KHz~30MHz AC line conducted emission test

Test Setup Photo

PC which controls EUT is in the remote side.

*** FRONT VIEW ***

*** REAR VIEW ***



Conducted Emissions Test Data

Model No. :	**GA1000**
Frequency range:	**150KHz to 30MHz**
Detector:	**Quasi-peak Value**
Temperature:	**26 ℃**
Humidity:	**60 %**

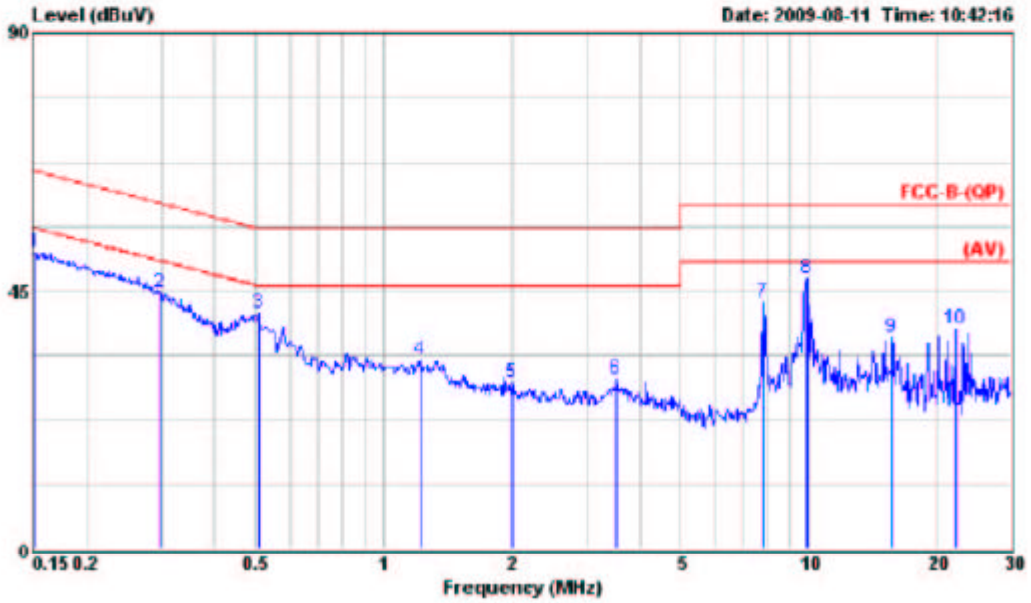
Test Data : # **798** **<** LINE **>**

799 # **86** **<** NEUTRAL **>**

Note 1. Level = Read Level + Probe (LISN) Factor + Cable Loss

2. Over Limit = Level – Limit Line = Margin

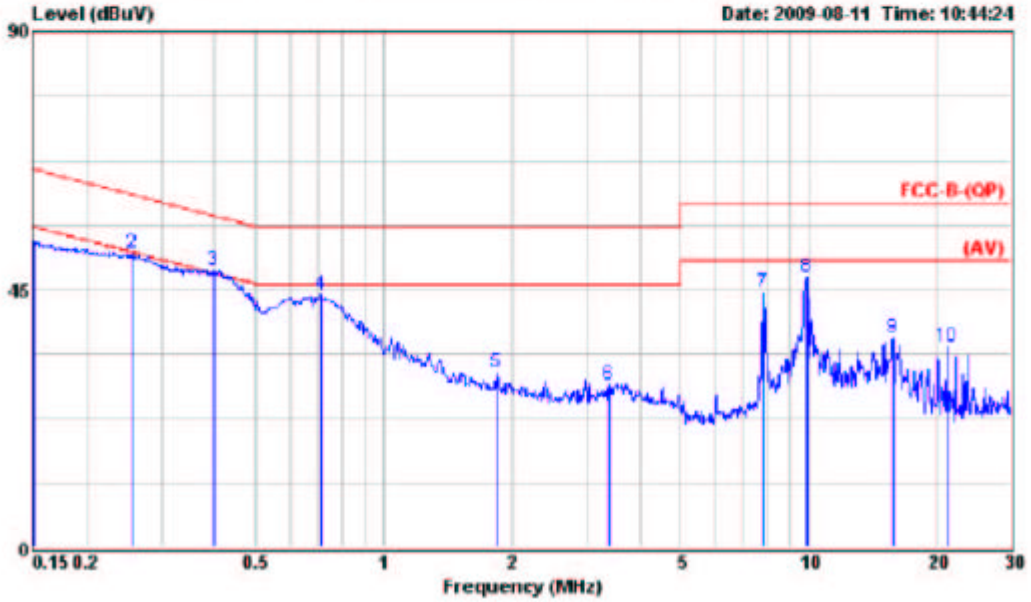
Data#: 798 File#: C:\Program Files\e3\98年\My Documents\FCC-B(QP).emi



Site : Linko Conduction No.1 (Glenn)
Condition : FCC-B-(QP) LISN.L(32A) LINE
FORM(EUT) : E960605-1
Power : AC 120V 60Hz
Curve : Peak Value Curve
Detect : Quasi Peak Value
Memo : T:26 / H:60%

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.151	51.74	-14.20	65.94	50.84	0.10	0.80	
2	0.297	44.58	-15.75	60.33	43.98	0.10	0.50	
3	0.507	41.01	-14.99	56.00	40.51	0.10	0.40	
4	1.220	32.80	-23.20	56.00	32.17	0.13	0.50	
5	2.000	29.10	-26.90	56.00	28.40	0.20	0.50	
6	3.530	29.70	-26.30	56.00	28.97	0.20	0.53	
7	7.850	43.03	-16.97	60.00	42.16	0.27	0.60	
8	9.860	46.98	-13.02	60.00	46.08	0.30	0.60	
9	15.720	36.76	-23.24	60.00	35.61	0.44	0.71	
10	22.180	38.45	-21.55	60.00	36.94	0.75	0.76	

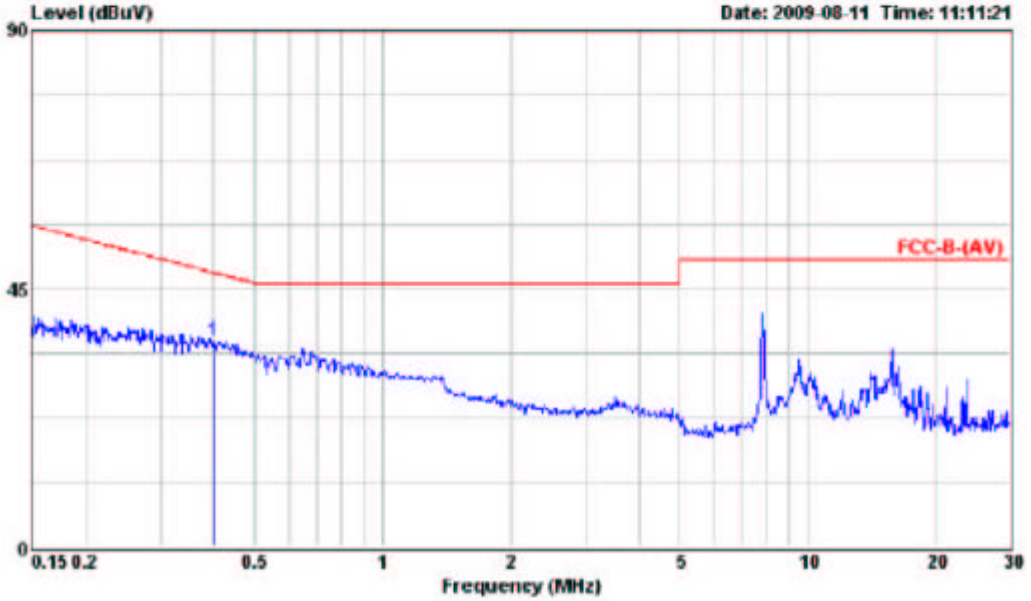
Data#: 799 File#: C:\Program Files\e3\98年\My Documents\FCC-B(QP).emi



Site : Linko Conduction No.1 (Glenn)
Condition : FCC-B-(QP) LISN.N(32A) NEUTRAL
FORM(EUT) : E9809305-1
Power : AC 120V 60Hz
Curve : Peak Value Curve
Detect : Quasi Peak Value
Memo : T:26 / H:60%

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	53.43	-12.57	66.00	52.53	0.10	0.80	
2	0.256	51.35	-10.21	61.56	50.75	0.10	0.50	
3 !	0.400	48.21	-9.64	57.85	47.71	0.10	0.40	
4	0.712	44.14	-11.86	56.00	43.57	0.16	0.41	
5	1.840	30.53	-25.47	56.00	29.83	0.20	0.50	
6	3.400	28.51	-27.49	56.00	27.79	0.20	0.52	
7	7.850	44.39	-15.61	60.00	43.52	0.27	0.60	
8	9.860	47.09	-12.91	60.00	46.19	0.30	0.60	
9	15.800	36.45	-23.55	60.00	35.35	0.38	0.72	
10	21.150	35.13	-24.87	60.00	34.07	0.28	0.78	

Data#: 86 File#: C:\Program Files\e3\98年\My Documents\FCC-B(AV).emi



Site : Linko Conduction No.1 (Glenn)
Condition : FCC-B-(AV) LISN.N(32A) NEUTRAL
FORM(eut) : E980805-I
power : AC 120V 60Hz
Cuvre : Average Value Curve
Detect : Average Value
Memo : T:26 / H:60%

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.404	35.98	-11.79	47.77	35.48	0.10	0.40	

9. §15.247(e): The Power Spectral Density

9.1 Test Procedure

§15.247, Measurement of Digital Transmission Systems. Alternative Test Procedures (2).

Temperature: **23** ℃ Humidity: **60** %

RBW=3KHz VBW=10KHz

SWT=100s Spectrum Line > 3KHz

Limit < +8dBm Test distance = 3m

9.2 Test result of Peak Power Spectral Density

For IEEE 802.11 b , we tested four data rate and the pre-scan results as below：

Data rate / result	A.P.	Spectrum read (dBμV/m)		
		Low CH1	Mid CH6	High CH11
1 Mbps	H	67.10	64.09	62.59
	V	53.94	52.49	49.19
2 Mbps	H	67.52	64.71	63.42
	V	54.25	52.73	48.33
5.5 Mbps	H	67.23	64.15	63.15
	V	54.73	53.02	48.72
11 Mbps	H	69.57	65.43	64.06
	V	55.66	53.78	49.28

For IEEE 802.11 b , the worst case (data rate 11Mbps) testing results summary as below：

Channel	A.P.	Frequency (GHz)	S.A. Read (dBμV/m)	C. L. (dB)	A. F. (dB)	E (dBμV/m)	E (V/m)	P (dBm)	Test Result
1	H	2.412	69.57	5.47	28.37	103.41	$148*10^{-3}$	3.01	PASS
	V		55.66			89.50	$29*10^{-3}$	-11.54	PASS
6	H	2.437	65.43	5.51	28.38	97.95	$78*10^{-3}$	-2.44	PASS
	V		53.78			87.67	$24*10^{-3}$	-13.01	PASS
11	H	2.462	64.06	5.55	28.39	98.00	$79*10^{-3}$	-2.29	PASS
	V		49.28			83.22	$14*10^{-3}$	-20.00	PASS

For IEEE 802.11 g , we tested four data rate and the pre-scan results as below：

Data rate / result	A.P.	Spectrum read (dBμV/m)		
		Low CH1	Mid CH6	High CH11
6 Mbps	H	62.62	61.82	59.73
	V	50.38	47.88	46.32
9 Mbps	H	61.59	60.74	58.34
	V	49.74	46.70	45.71
12 Mbps	H	61.13	60.25	58.03
	V	49.15	46.13	45.24
18 Mbps	H	60.42	59.71	57.49
	V	48.74	45.85	44.91
24 Mbps	H	60.14	59.19	57.10
	V	48.11	45.34	44.54
36 Mbps	H	60.72	59.48	57.55
	V	48.50	45.70	44.98
48 Mbps	H	60.97	59.81	57.96
	V	49.42	46.39	45.01
54 Mbps	H	61.23	60.72	58.44
	V	49.77	46.98	45.65

For IEEE 802.11 g , the worst case (data rate 6Mbps) testing results summary as below：

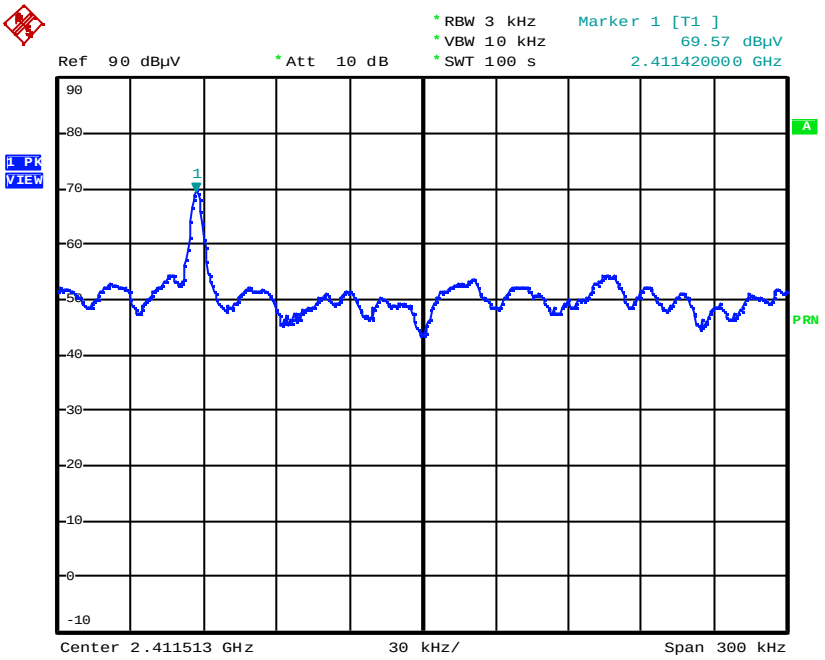
Channel	A.P.	Frequency (GHz)	S.A. Read (dBμV/m)	C. L. (dB)	A. F. (dB)	E (dBμV/m)	E (V/m)	P (dBm)	Test Result
1	H	2.412	62.62	5.47	28.37	96.46	$66*10^{-3}$	-3.87	PASS
	V		50.38			84.22	$16*10^{-3}$	-16.98	PASS
6	H	2.437	61.82	5.51	28.38	95.71	$61*10^{-3}$	-4.55	PASS
	V		47.88			81.77	$12*10^{-3}$	-20.00	PASS
11	H	2.462	59.73	5.55	28.39	93.67	$48*10^{-3}$	-6.77	PASS
	V		46.32			80.26	$10*10^{-3}$	-20.45	PASS

Note: “A.P.” means Antenna Polarization
“S.A.” Read” means Spectrum Analyzer Reading
“C.L.” means RF Cable Loss
“A.F.” means Antenna Factor
E = S.A Read + C.L. + A.F.
$P (W) = (E \times d)^2 / 30 \times G$
Where: E = the measured maximum field strength in V/m.
G = the numeric gain of the transmitting antenna over an isotropic radiator.
= 5dBi = 3.16
d = the distance in meters from which the field strength was measured.
= 3m

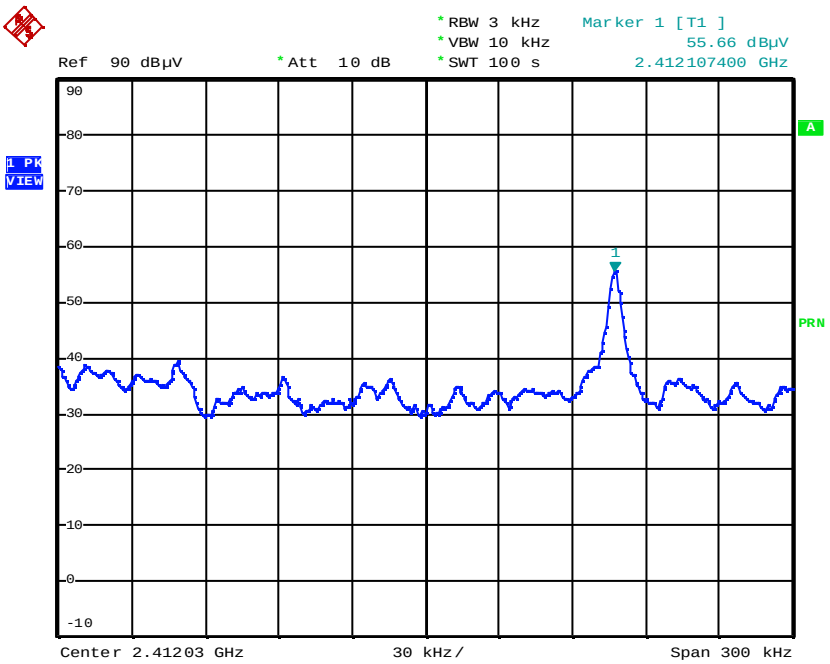
9.3 Spectrum Plot Data

IEEE 802.11b

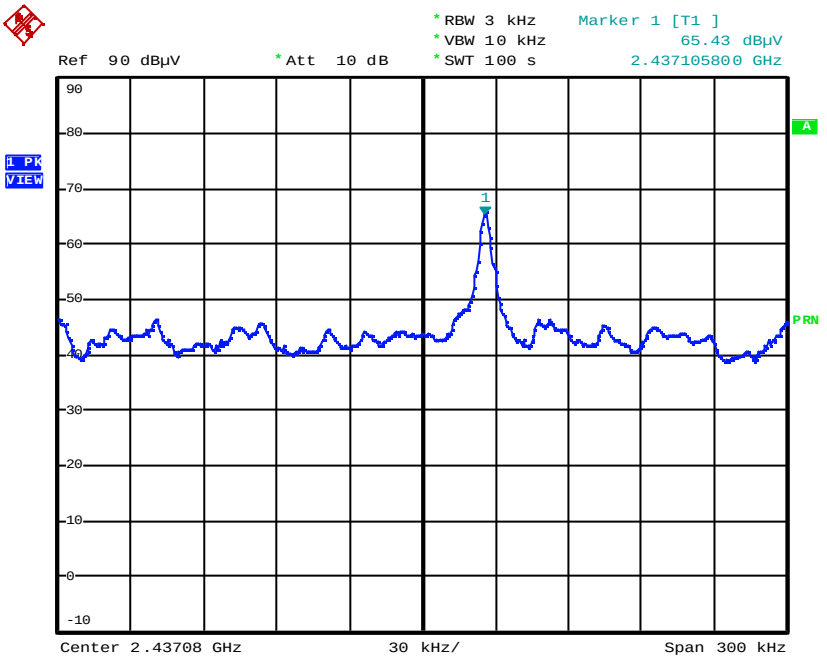
Channel No. : CH 1 (Low)
Data Rate: 11 Mbps
Horizontal



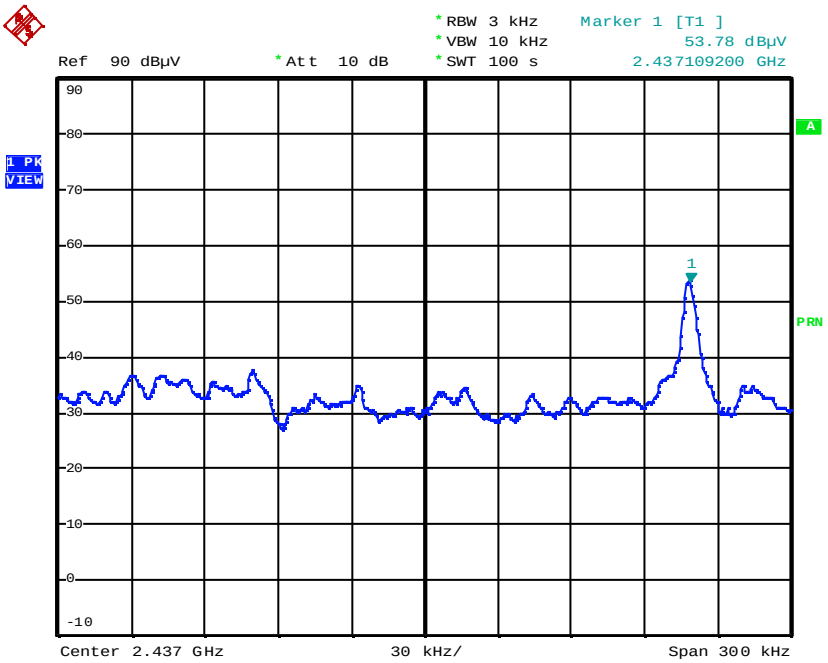
Vertical



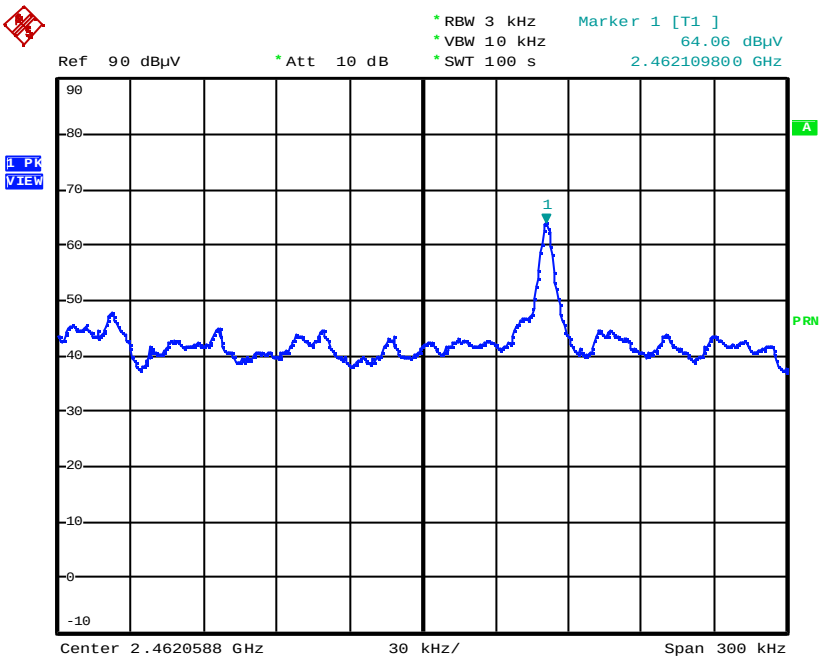
Channel No. : CH 6 (Mid)
Data Rate: 11 Mbps
Horizontal



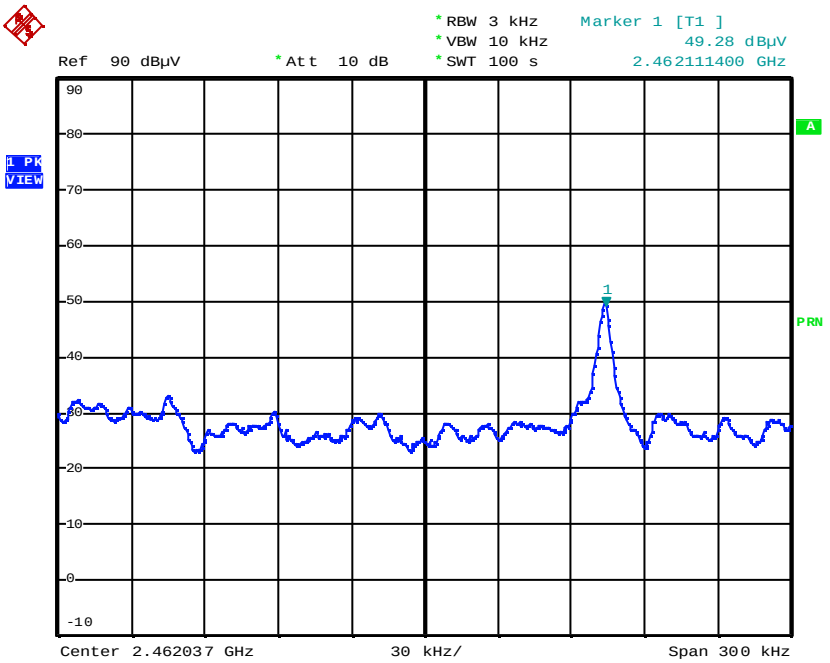
Vertical



Channel No. : CH 11 (High)
Data Rate: 11 Mbps
Horizontal

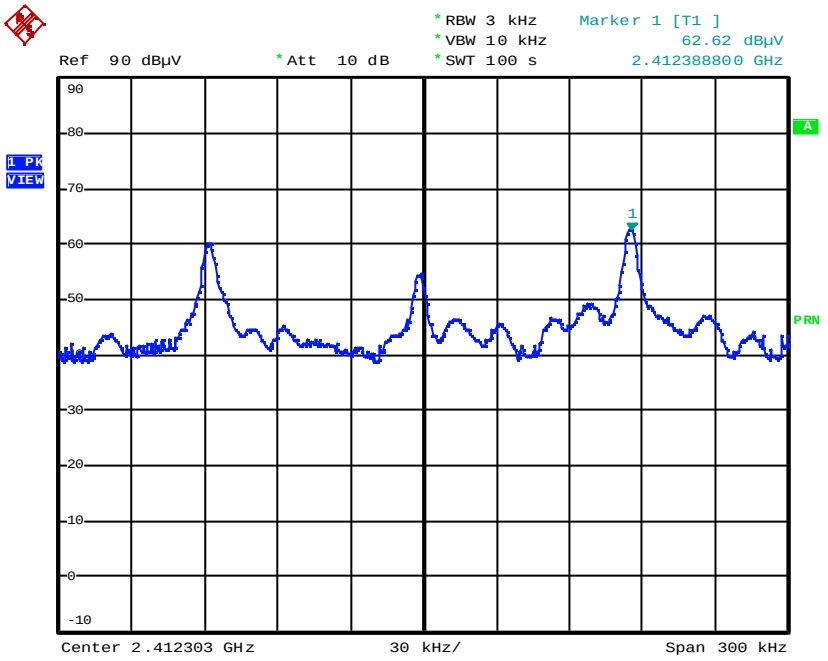


Vertical

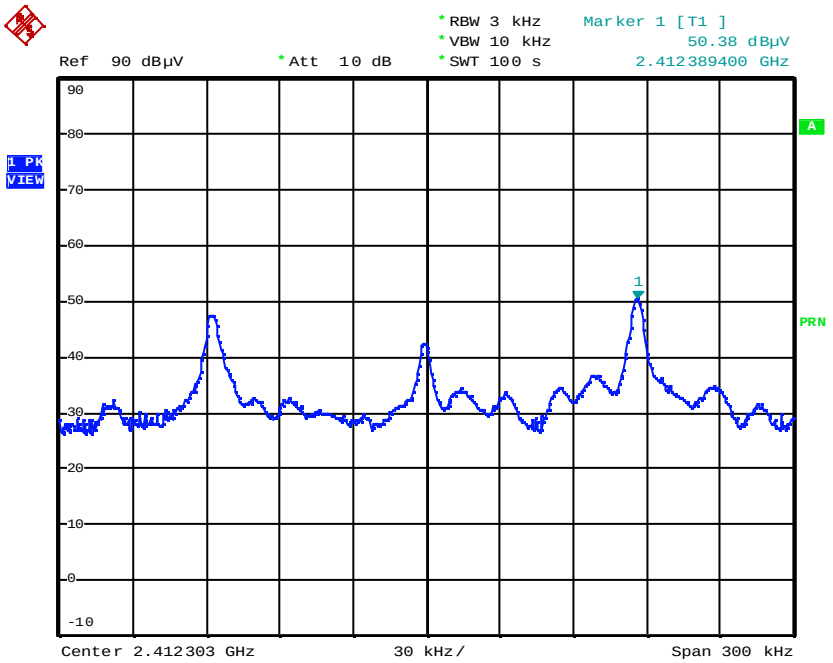


IEEE 802.11g Test Data

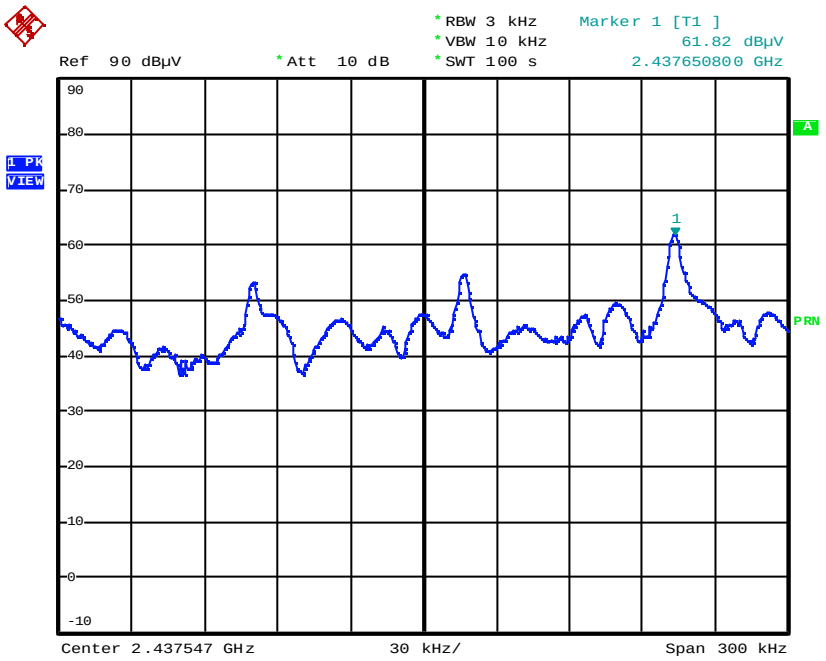
Channel No. : CH 1 (Low)
Data Rate: 6 Mbps
Horizontal



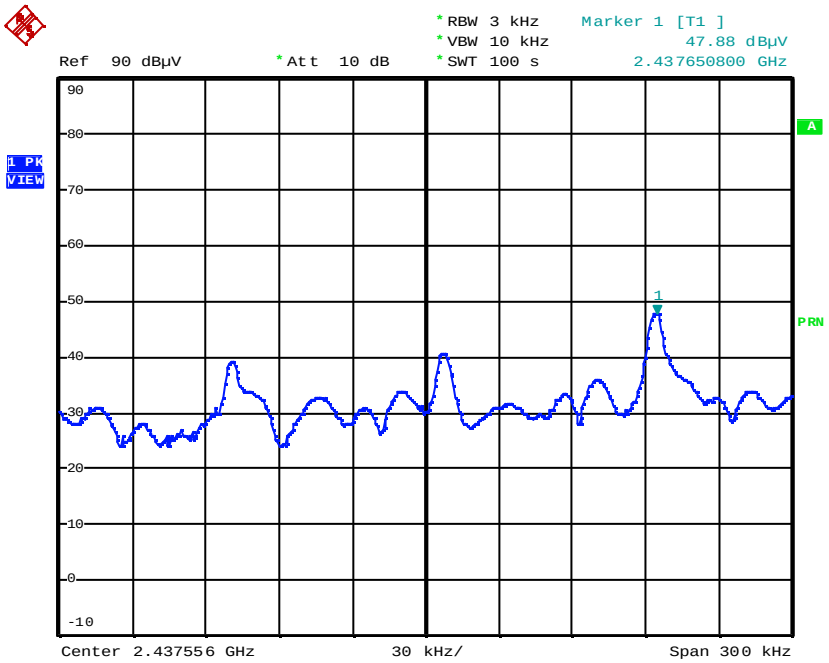
Vertical



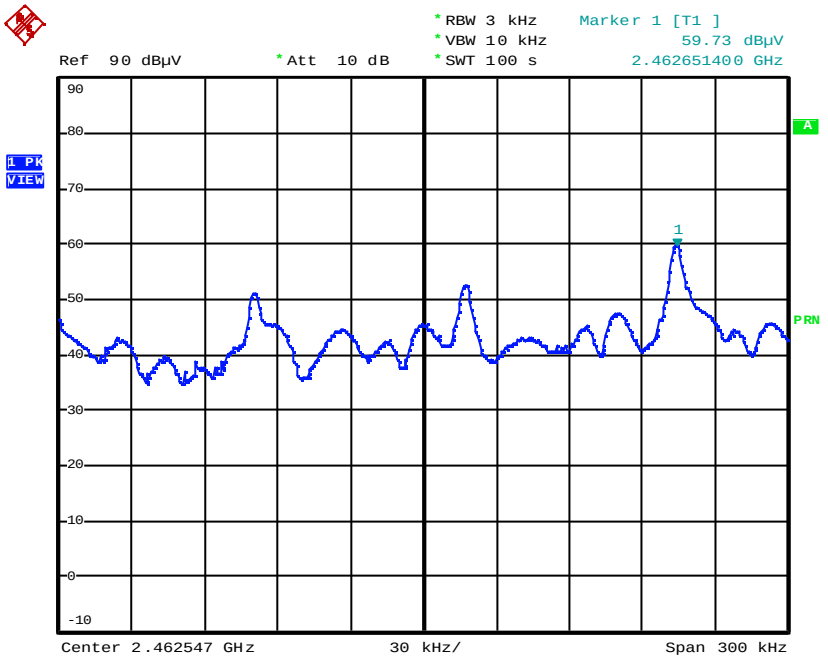
Channel No. : CH 6 (Mid)
Data Rate: 6 Mbps
Horizontal



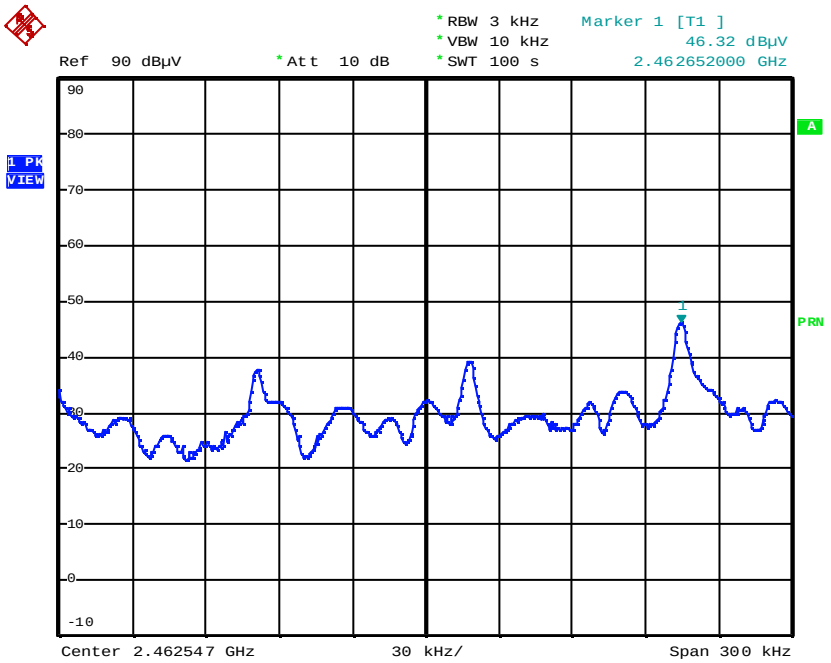
Vertical



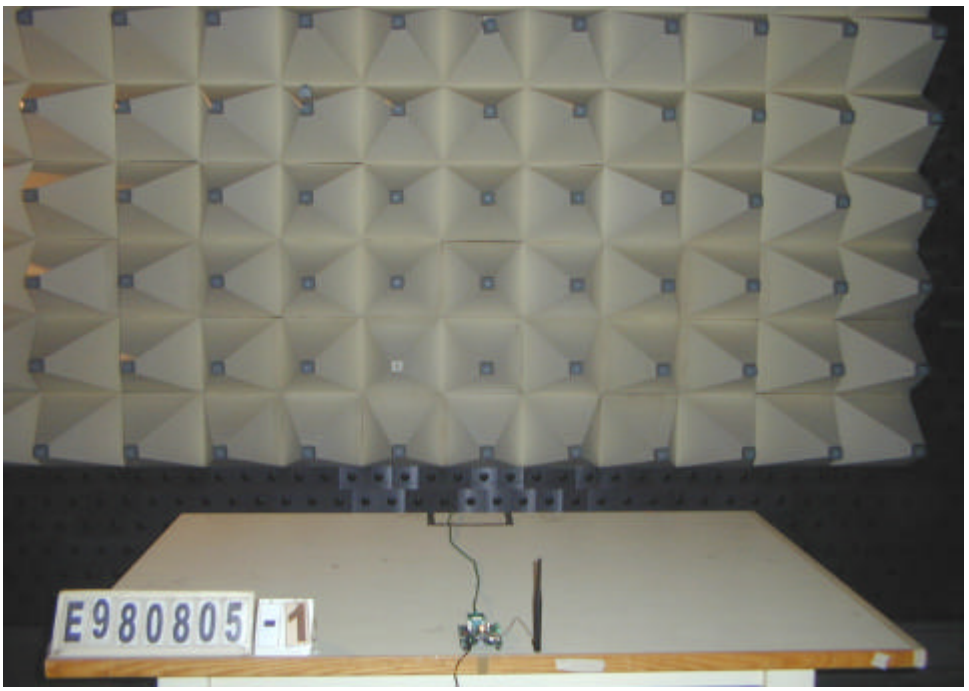
Channel No. : CH 11 (High)
Data Rate: 6 Mbps
Horizontal



Vertical



9.4 Test Setup Photo



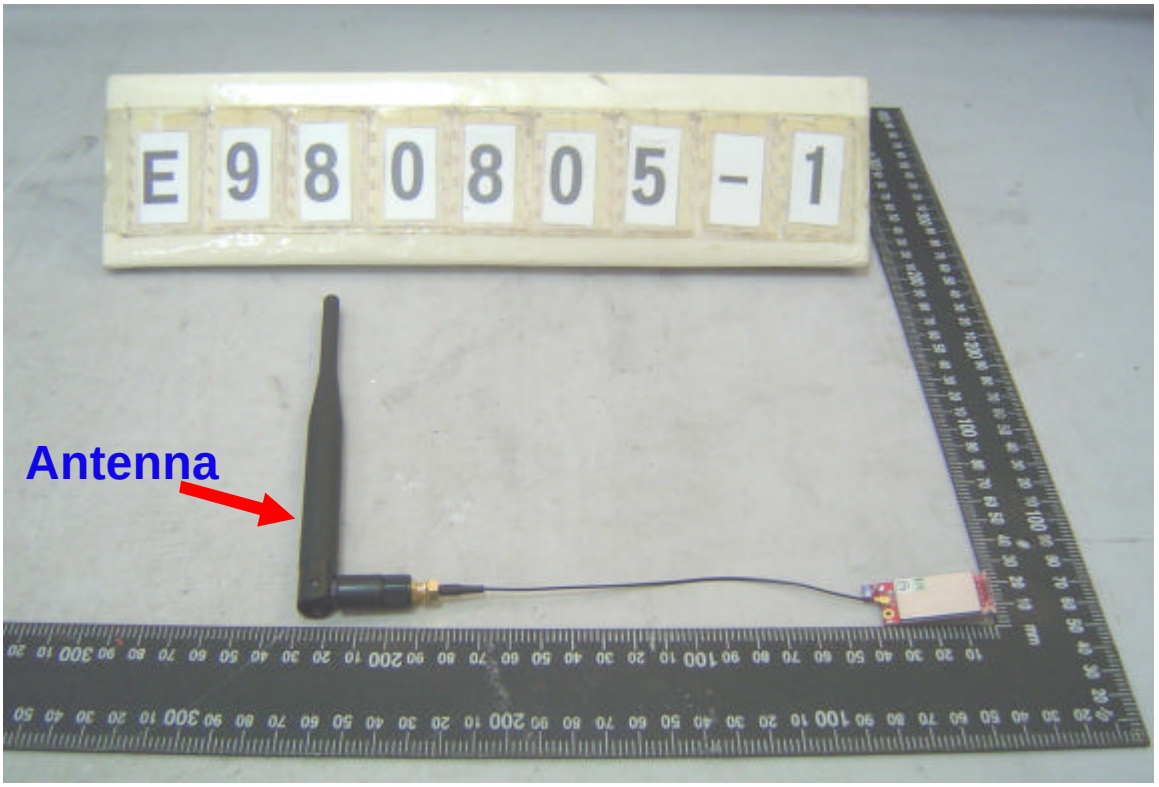
10. List of Test Instruments

Test Site	Instrument	Manufacturer	Model No.	S/N	Next Cal. Date	Cal. Interval
Chamber (No. 1)	Spectrum Analyzer	ROHDE& SCHWARZ	FSP	830180/006	Nov. 16, 2009	1 Year
	30MHz~1GHz RF Cable	YEIDA WIRE CABLE	N/A	N/A	Jan. 18, 2010	1 Year
	1GHz~18GHz RF Cable	HUBER SUHNER	SUCOFLEX 104	201404/4	Sep. 21, 2010	1 Year
	Horn Antenna 1GHz~18GHz	COM-POWER	AH-118	10056	Mar. 12, 2010	1 Year
	Antenna	SCHWARZBECK	VULB 9161	4078	Jan. 16, 2010	1 Year
	Pre-Amplifier	Schaffner	CPA-9232	1028	Jan. 20, 2010	1 Year
	Preamplifier 1GHz~18GHz	MITEQ	28-5A	513015	Oct. 14, 2010	1 Year
Conduction (No.1)	Receiver	R&S	ESHS10	830223/008	Nov. 23, 2009	1 Year
	Spectrum Analyzer	R&S	FSP	833387/001	Nov. 03, 2010	1 Year
	RF cable	N/A	N/A	N/A	Jan. 18, 2010	1 Year
	L.I.S.N	R&S	ESH2-Z5	831886/004	Apr. 22, 2010	1 Year
	DC LISN	Mess Tec	LN-KFZ/100	2001/019	Apr. 22, 2010	1 Year

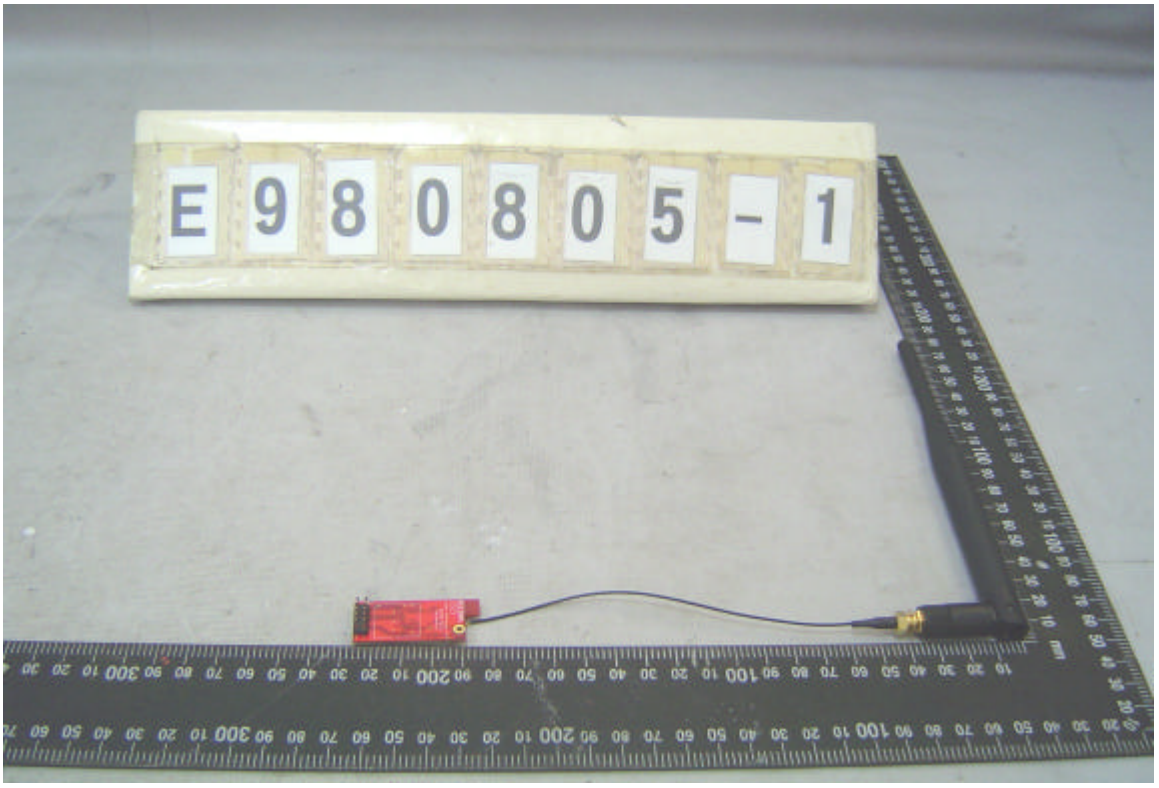
11. EUT Photos

FCC ID. : XOJGA1000

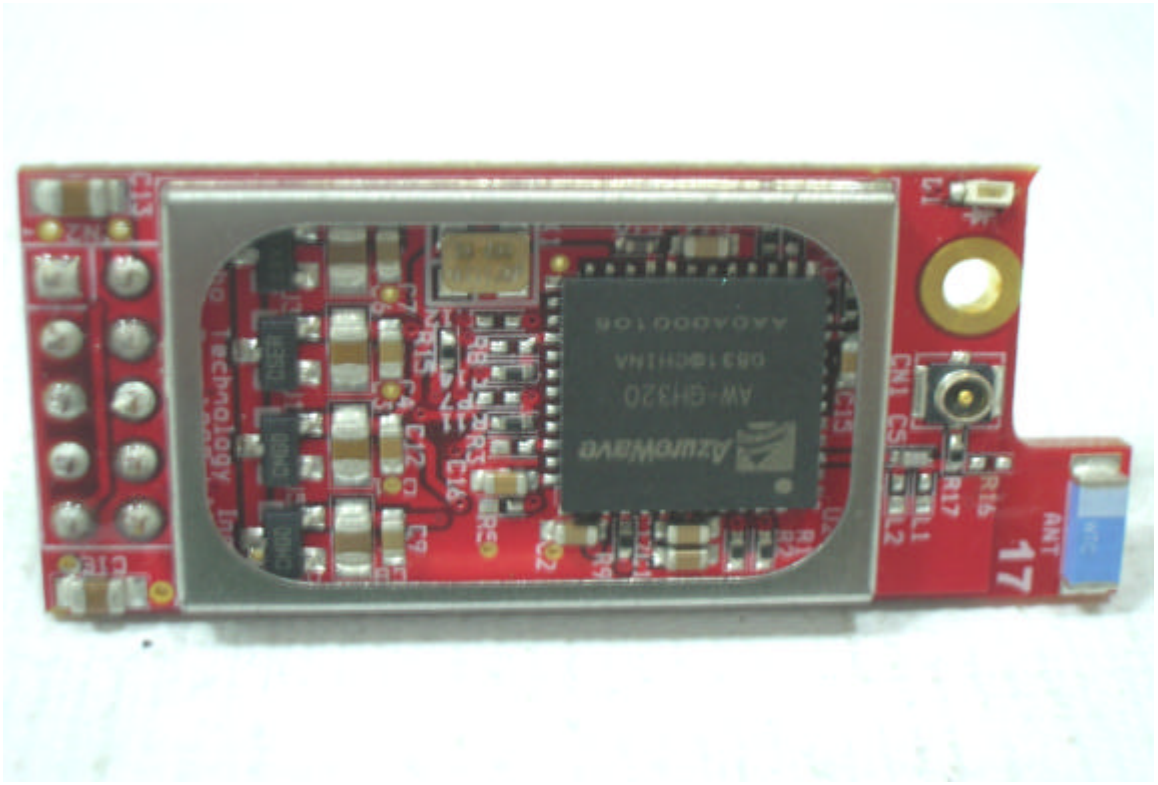
EUT FRONT VIEW



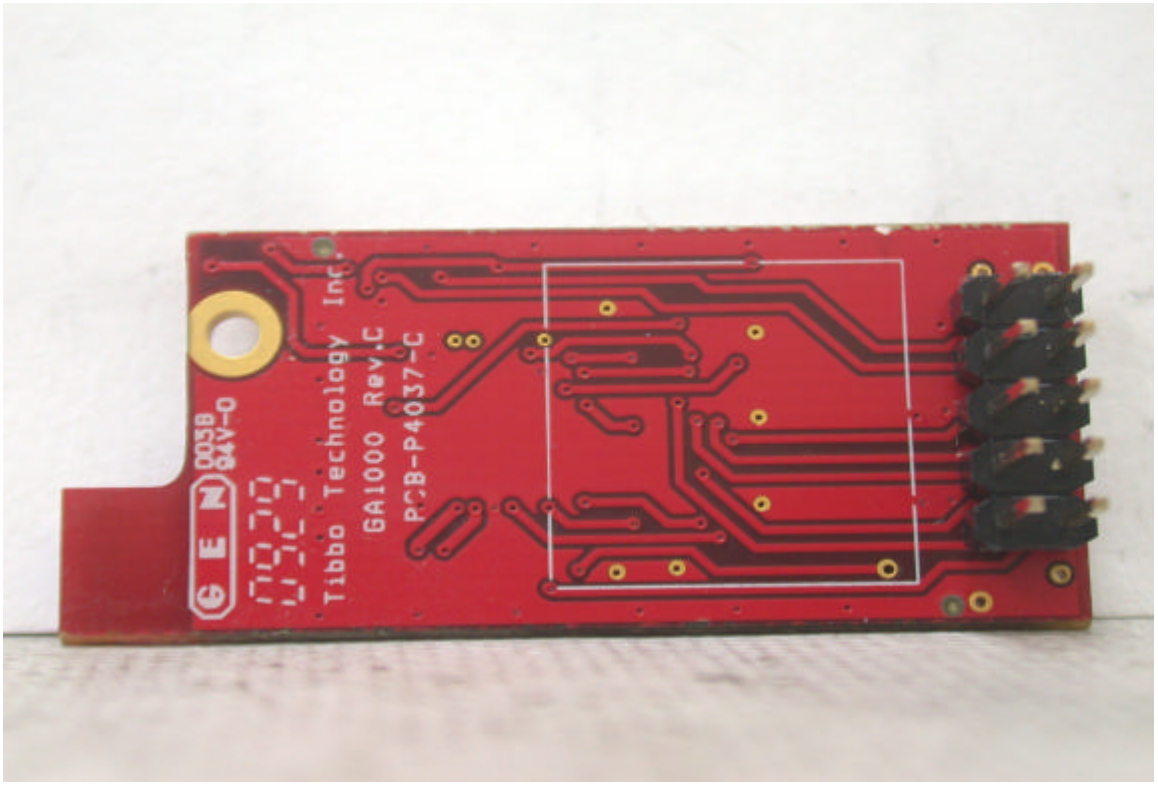
EUT REAR VIEW



EUT COMPONENT VIEW



EUT SOLDERING VIEW



EUT MODULE VIEW