



Intertek Testing Services

ETL SEMKO

FCC ID. : M4Y-0XG950

Report No.: EME-030876

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EMC TEST REPORT

Report No. : EME-030876

Model No. : XG-950

Issued Date : Aug. 7, 2003

Applicant : Z-COM, Inc.
7F-2, No. 9, Prosperity 1st RD., Science-Based Industrial
Park, Hsinchu, Taiwan

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

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Project Engineer

Jerry Liu

Reviewed By

Elton Chen



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Summary of Tests

IEEE 802.11g Wireless LAN PCI Card-Model: XG-950
FCC ID: M4Y-0XG950

Test	Reference	Results
Minimum 6dB Bandwidth test	15.247(a)(2)	Complies
Maximum Output Power test	15.247(b)	Complies
Radiated Spurious Emission test	15.205, 15.209	Complies
Power Spectrum Density test	15.247(d)	Complies
Power Line Conducted Emission test	15.207	Complies



1. General information

1.1 Identification of the EUT

Applicant	: Z-COM, Inc.
Product	: IEEE 802.11g Wireless LAN PCI Card
Model No.	: XG-950
FCC ID.	: M4Y-0XG950
Frequency Range	: 2412~2462 MHz
Channel Number	: 11 Channels
Frequency of Each Channel	: 2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz
Type of Modulation	: DSSS, OFDM
Rated Power	: 3.3Vdc
Power Cord	: N/A
Sample Received	: July 24, 2003
Test Date(s)	: July 24, 2003 ~ Aug. 7, 2003

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The 802.11g Wireless LAN PCI Card is a standard PCI adapter that fits into any standard PCI slot in a desktop computer. The 802.11g Wireless LAN PCI Card is an enhanced high-performance, that supports high-speed wireless networking at home, at office or in public places. 802.11g Wireless LAN PCI Card is able to communicate with any 802.11b and 802.11g compliant products.

For more detail features, please refer to User's manual as file name "Installation guide.pdf"



1.3 Antenna description

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain : 2.0 dBi

Antenna Type : Dipole

Connector Type : SMA Reverse

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
PC	HP	DTPC-16	SG20400787	FCC DoC Approved
Key Board	HP	SK-2502C	M011234429	FCC DoC Approved
Monitor	HP	D8897	CN14835153	ARSCM560S
Mouse	HP	M-S48a	LZE14652508	FCC DoC Approved
Printer	HP	C2642A	TH86K1N2ZB	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved



2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section § 15.205 、 § 15.207 、 § 15.209 、 § 15.247 and ANSI C63.4/1992.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

The EUT was continuously transmitted during the test.

After verifying the maximum output power, we found the maximum output power of 802.11b was occurred at 11Mbps data rate and 802.11g was occurred at 54Mbps data rate. The final test was executed under this condition and recorded in this report individually.



2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Series No.	Last Cal.Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	825788/014	Feb. 18, 2003
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	825428/005	June 10, 2003
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2003
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	100186	Oct. 9, 2002
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5890	Sep. 19, 2002
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	159	June 21, 2003
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	3133	Feb. 21, 2003
Turn Table	HDGmbH	N/A	DS 420S	420/669/01	N/A
Antenna Tower	HDGmbH	N/A	MA 240	240/573	N/A
Microwave Amplifier	Agilent	2GHz~26.5GHz	8348A	3111A00567	Dec. 20, 2002

Note:

1. The calibration interval of the above instruments is 12 months.



3. Minimum 6dB Bandwidth test

3.1 Operating environment

Temperature: 24 °C
Relative Humidity: 70 %
Atmospheric Pressure 1023 hPa

3.2 Test setup & procedure

The minimum 6dB bandwidth per FCC §15.247(a)(2) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW. The test was performed at 3 channels (lowest, middle and highest channel). The minimum 6-dB modulation bandwidth is in the following Table.

3.3 Measured data of Minimum 6dB Bandwidth test results

Test Condition: 802.11b operation (DSSS modulation)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2412	11.90381	> 500kHz
Middle	2437	11.02204	> 500kHz
High	2462	10.94188	> 500kHz

Test Condition: 802.11g operation (OFDM modulation)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2412	16.51303	> 500kHz
Middle	2437	16.51303	> 500kHz
High	2462	16.47295	> 500kHz

Please see the plot below.



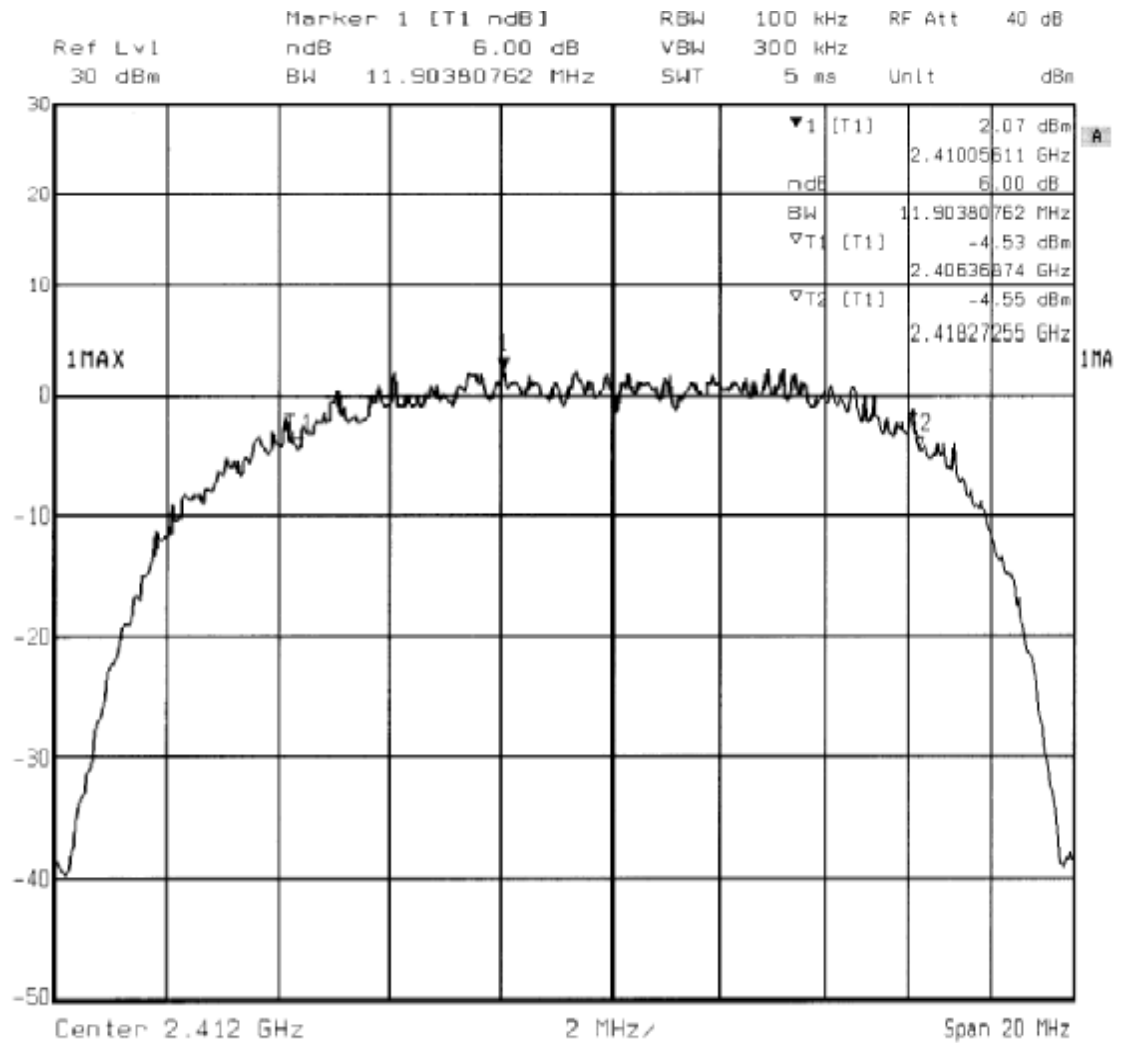
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Comment A: 802.11b 6dB bandwidth at low channel (EC365)

Date: 29.JUL.2003 13:59:38



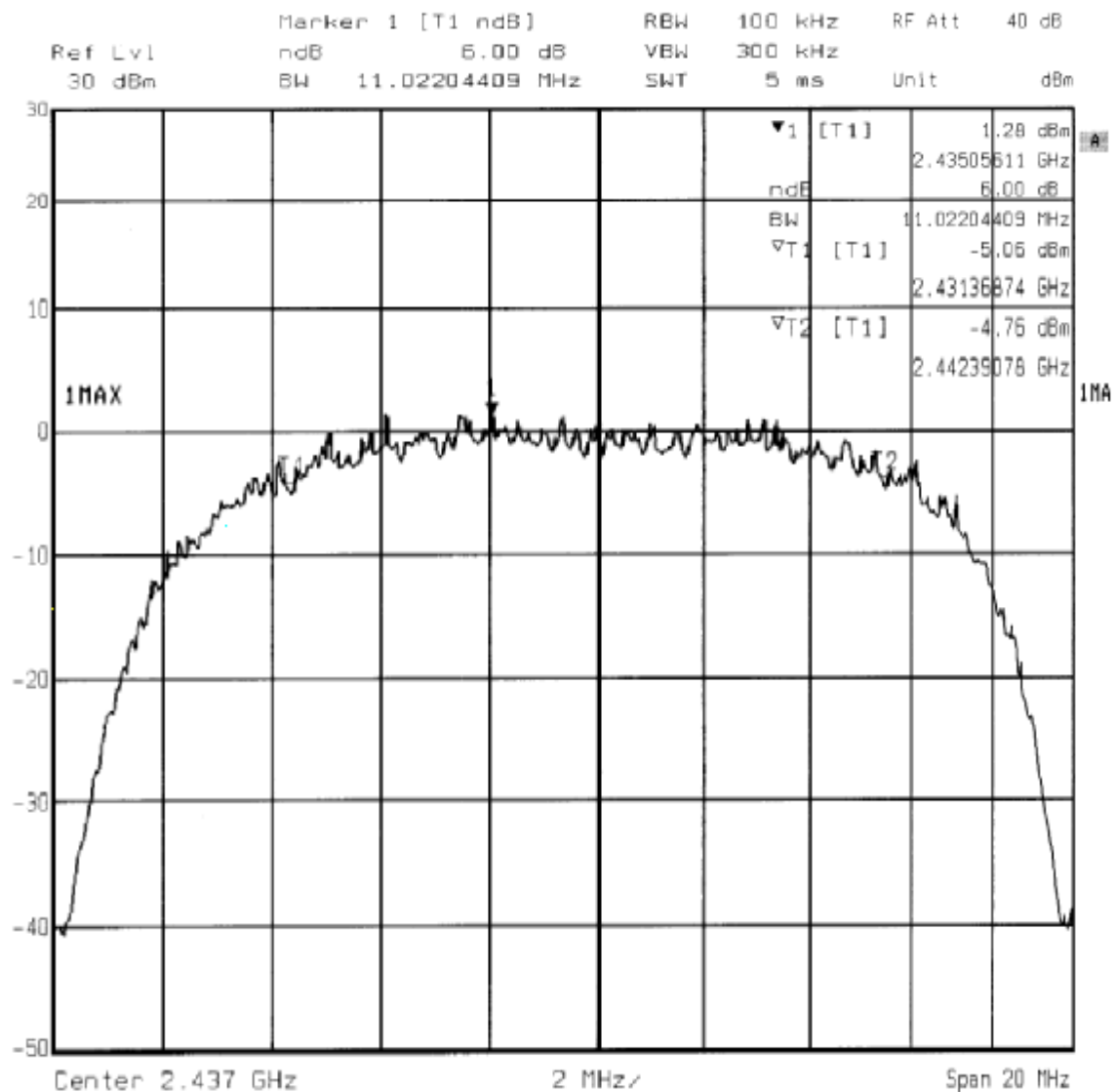
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Comment A: 802.11b 6dB bandwidth at middle channel (EC365)

Date: 29.JUL.2003 13:58:51



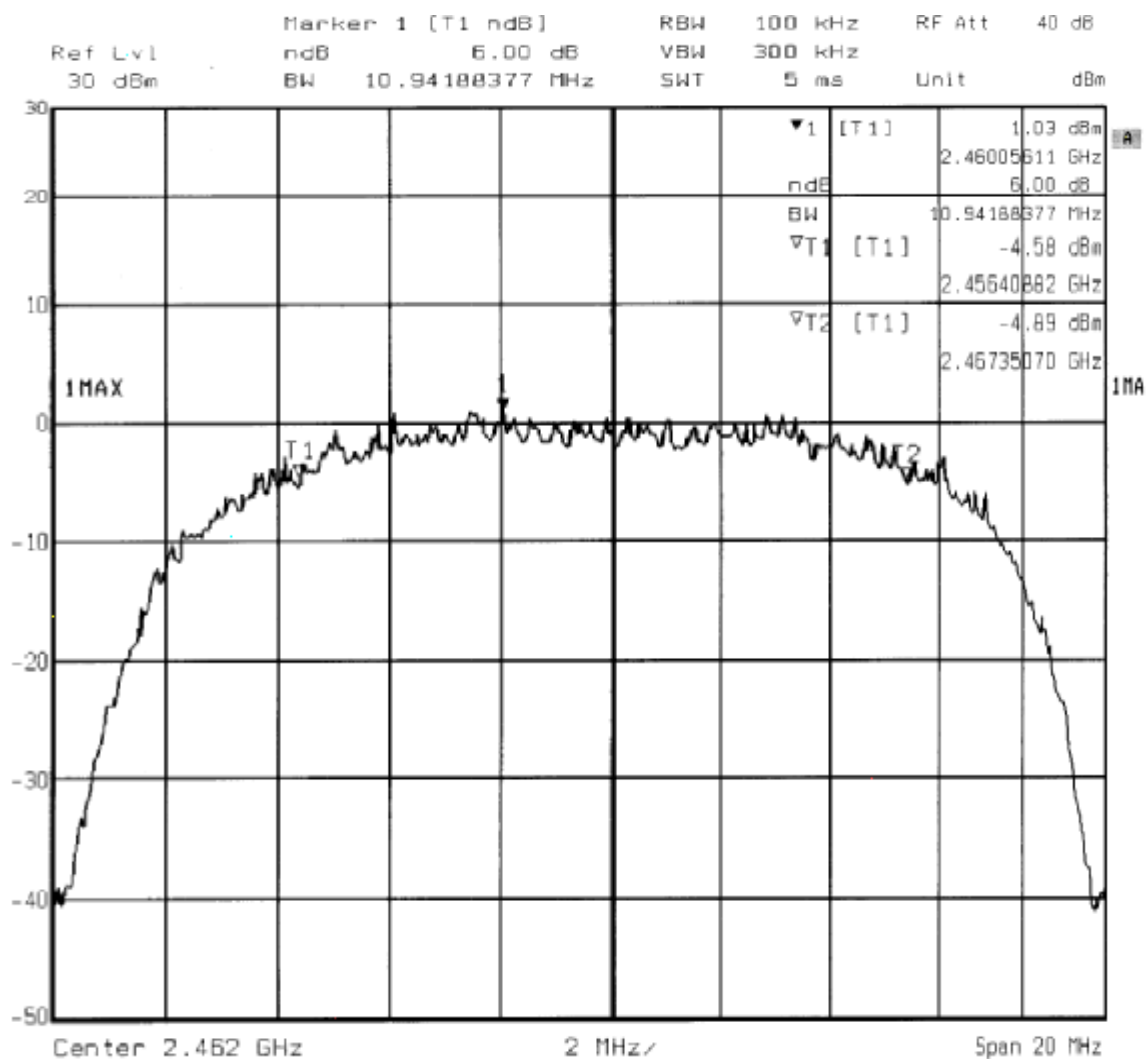
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Comment A: 802.11b 6dB bandwidth at high channel (EC365)

Date: 29.JUL.2003 14:00:19



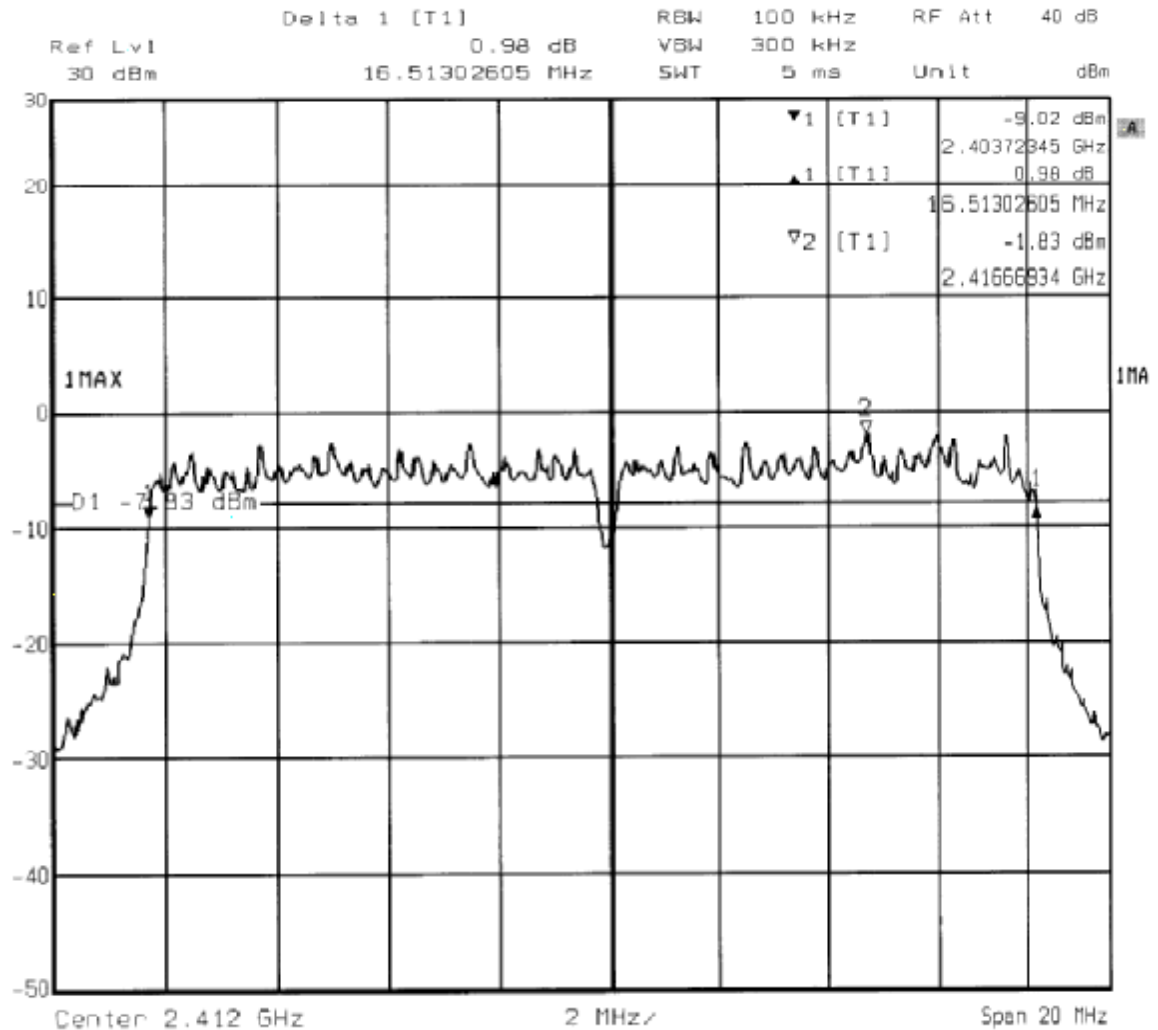
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Comment A: 802.11g 6dB bandwidth at low channel (EC365)

Date: 29.JUL.2003 14:03:47



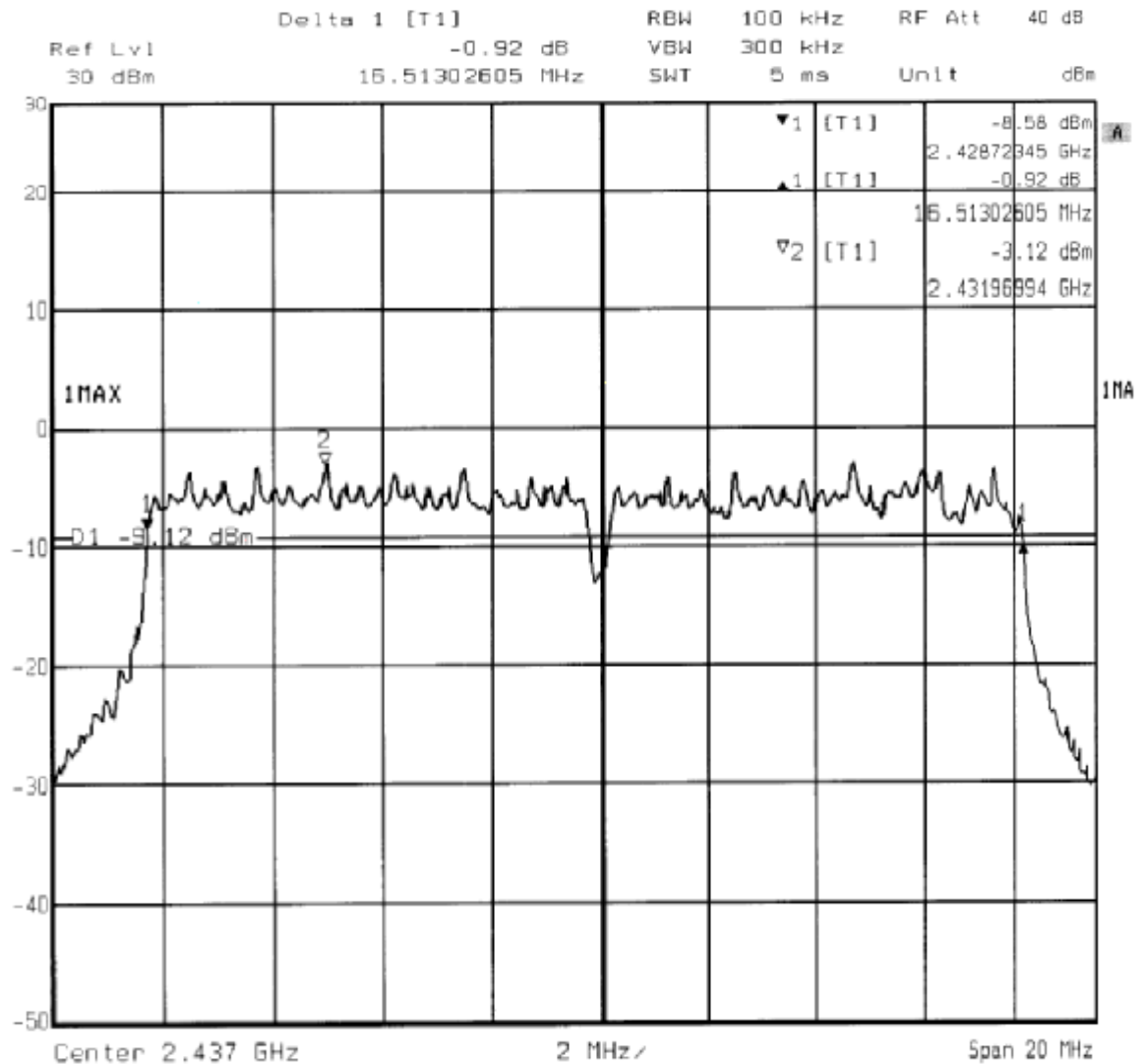
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Comment A: 802.11g 6dB bandwidth at middle channel (EC365)

Date: 29.JUL.2003 14:06:32



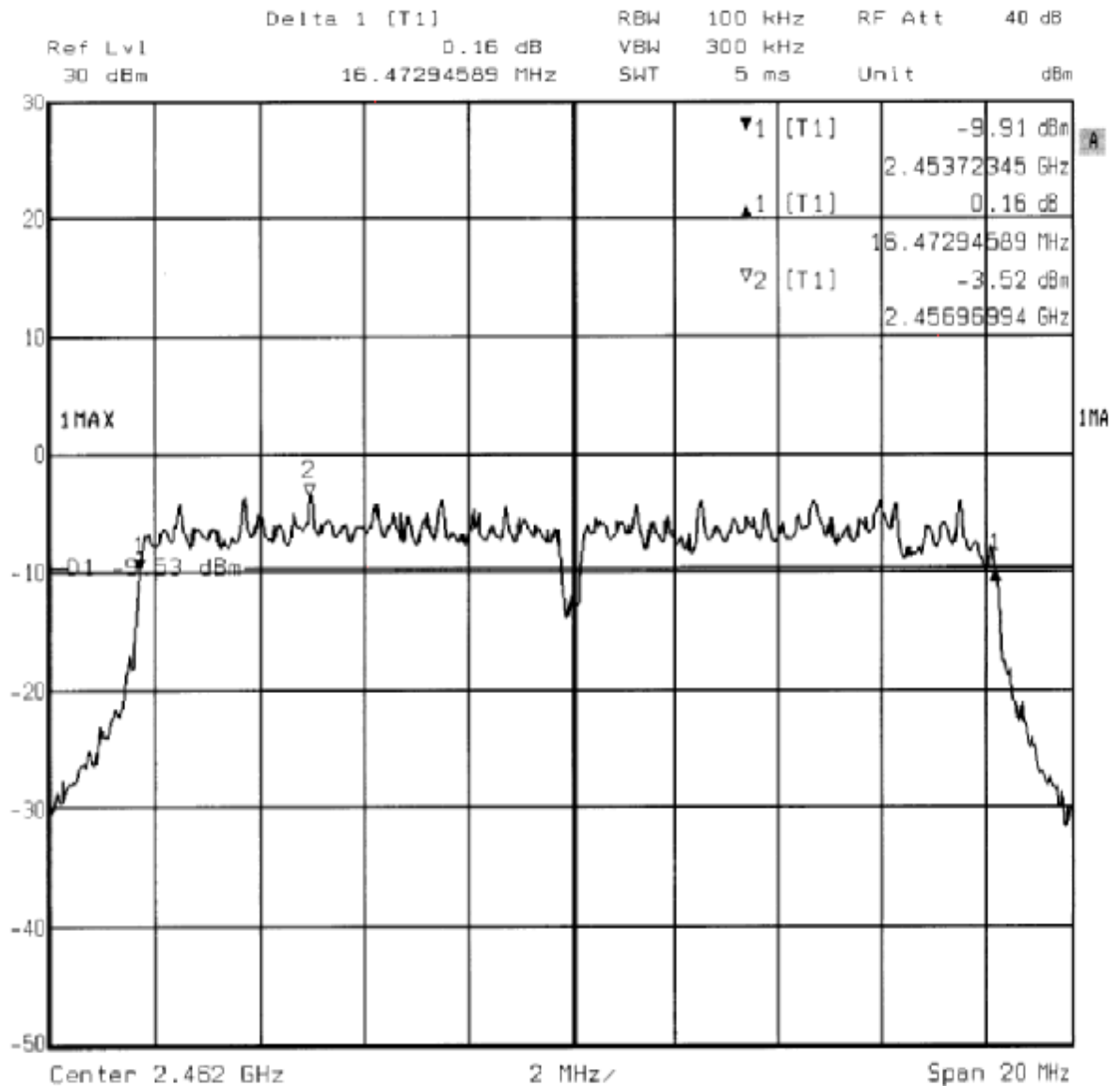
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Comment A: 802.11g 6dB bandwidth at high channel (EC365)

Date: 29.JUL.2003 14:08:04



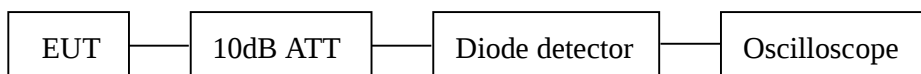
4. Maximum Output Power test

4.1 Operating environment

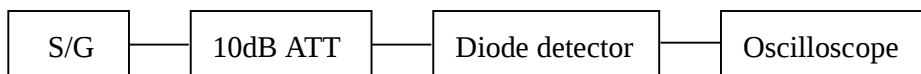
Temperature: 24 °C
Relative Humidity: 70 %
Atmospheric Pressure 1023 hPa

4.2 Test setup & procedure

A:



B:



1. The output of the transmitter via a 10 dB attenuator and coupled to a diode detector.
2. The output of the diode detector connected to the vertical channel of and oscilloscope. The observed trace of the oscilloscope shall be recorded as “A”.
3. The transmitter replaced by a signal generator. The output frequency of the signal made equal to the center of the frequency range occupied by the transmitter and unmodulated.
4. The output of the signal generator raised to reach the peak of trace “A” named X.
5. The signal generator output level X (dBm) is the transmitter peak output power.

4.3 Measured data of Maximum Output Power test results

Test Condition: 802.11b operation (DSSS modulation)

Channel	Frequency (MHz)	C.B.L. (dB)	Reading (dBm)	Output Power		Limit (W)
				(dBm)	(mW)	
Lowest	2412	2.13	16.41	18.54	71.45	1
Middle	2437	2.13	15.72	17.85	60.95	1
Highest	2462	2.13	14.80	16.93	49.32	1



Test Condition: 802.11g operation (OFDM modulation)

Channel	Frequency (MHz)	C.B.L. (dB)	Reading (dBm)	Output Power		Limit (W)
				(dBm)	(mW)	
Lowest	2412	2.13	14.65	16.78	47.64	1
Middle	2437	2.13	13.87	16.00	39.81	1
Highest	2462	2.13	13.10	15.23	33.34	1



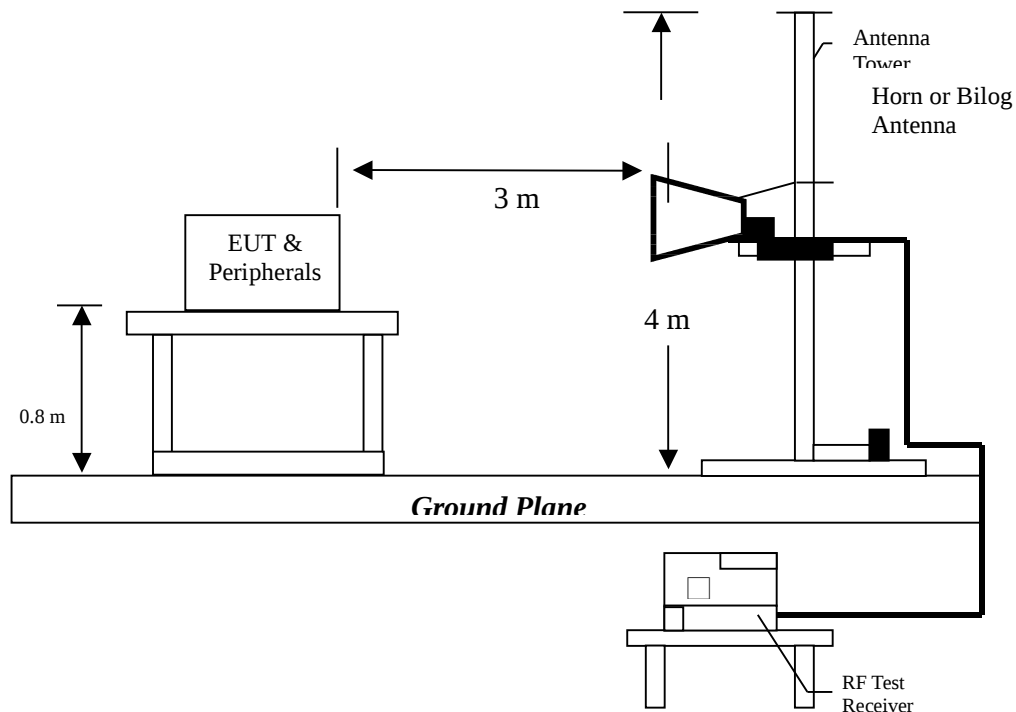
5. Radiated Emission test

5.1 Operating environment

Temperature:	25	°C	(10-40°C)
Relative Humidity:	55	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1060hPa)

5.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report. The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.



The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

5.3 Emission limits

The spurious Emission shall test through the 10th harmonic. 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).

Frequency (MHz)	Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.

Expanded uncertainty (k=2) of radiated emission measurement is ± 4.98 dB.

Expanded uncertainty (k=2) of conducted emission measurement is ± 2.02 dB.



5.4 Radiated spurious emission test data

5.4.1 Measurement results: frequencies equal to or less than 1 GHz

The radiated spurious emissions at

Frequency(MHz)	Margin
35.8	-3.30
249.2	-4.90

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

EUT : XG-950

Worst Case Condition : 802.11b (DSSS modulation) Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
35.8	QP	V	12.85	23.85	36.70	40.00	-3.30	138	67
76.6	QP	V	10.18	22.32	32.50	40.00	-7.50	121	80
90.1	QP	V	10.03	21.47	31.50	43.50	-12.00	138	190
249.2	QP	V	12.86	16.94	29.80	46.00	-16.20	109	311
860.3	QP	V	24.42	6.48	30.90	46.00	-15.10	135	168
928.2	QP	V	25.24	8.36	33.60	46.00	-12.40	125	345
92.1	QP	H	10.24	23.16	33.40	43.50	-10.10	143	187
198.8	QP	H	12.03	18.17	30.20	43.50	-13.30	129	264
220.1	QP	H	11.82	21.98	33.80	46.00	-12.20	118	155
249.2	QP	H	12.86	28.24	41.10	46.00	-4.90	130	160
544.1	QP	H	19.58	11.12	30.70	46.00	-15.30	165	173
645.0	QP	H	21.32	9.88	31.20	46.00	-14.80	175	158

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss



EUT : XG-950

Worst Case Condition : 802.11g (OFDM modulation) Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
37.8	QP	V	12.93	16.77	29.70	40.00	-10.30	100	247
76.6	QP	V	10.18	22.02	32.20	40.00	-7.80	108	44
249.2	QP	V	12.86	14.94	27.80	46.00	-18.20	151	175
800.2	QP	V	24.28	6.12	30.40	46.00	-15.60	166	341
879.7	QP	V	24.23	9.27	33.50	46.00	-12.50	135	168
926.3	QP	V	25.24	8.36	33.60	46.00	-12.40	131	320
96	QP	H	10.60	22.80	33.40	43.50	-10.10	196	250
220.1	QP	H	11.82	19.98	31.80	46.00	-14.20	118	156
249.2	QP	H	12.86	24.84	37.70	46.00	-8.30	109	311
400.5	QP	H	16.96	10.34	27.30	46.00	-18.70	146	360
544.1	QP	H	19.58	11.52	31.10	46.00	-14.90	171	160
932.1	QP	H	25.34	12.06	37.40	46.00	-8.60	135	360

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss



5.4.2 Measurement results: frequency above 1GHz

EUT : XG-950

Test Condition : 802.11b (DSSS modulation) Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
4076	PK	V	31.88	34.59	47.14	49.85	74	-24.15	149	210
4076	AV	V	31.88	34.59	39.93	42.64	54	-11.36	149	210
4076	PK	H	31.88	34.59	46.14	48.85	74	-25.15	148	167
4076	AV	H	31.88	34.59	32.41	35.12	54	-18.88	148	167

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

For PK:

1GHz-3GHz: 50dBuV

3GHz-14GHz: 54dBuV

14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV

3GHz-14GHz: 46dBuV

14GHz-26.5GHz: 46.5dBuV



EUT : XG-950

Test Condition : 802.11b (DSSS modulation) Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
4126	PK	V	31.88	34.59	50.37	53.08	74	-20.92	103	146
4126	AV	V	31.88	34.59	46.29	49.00	54	-5.00	103	146
2063	PK	H	33.74	29.36	58.53	54.15	74	-19.85	148	245
2063	AV	H	33.74	29.36	47.76	43.38	54	-10.62	148	245
4126	PK	H	31.88	34.59	47.01	49.72	74	-24.28	161	250
4126	AV	H	31.88	34.59	41.11	43.82	54	-10.18	161	250

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

For PK:

1GHz-3GHz: 50dBuV

3GHz-14GHz: 54dBuV

14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV

3GHz-14GHz: 46dBuV

14GHz-26.5GHz: 46.5dBuV



EUT : XG-950

Test Condition : 802.11b (DSSS modulation) Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz (H/V)	Preamplifier (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna height (cm)	Turn Table angle (degree)
2088	PK	V	33.74	29.36	57.11	52.73	74	-21.27	150	158
2088	AV	V	33.74	29.36	47.75	43.37	54	-10.63	150	158
4176	PK	V	31.88	34.59	49.09	51.80	74	-22.20	172	131
4176	AV	V	31.88	34.59	45.31	48.02	54	-5.98	172	131
2088	PK	H	33.74	29.36	58.83	54.45	74	-19.55	131	230
2088	AV	H	33.74	29.36	48.94	44.56	54	-9.44	131	230
4176	PK	H	31.88	34.59	47.09	49.80	74	-24.2	150	253
4176	AV	H	31.88	34.59	40.39	43.10	54	-10.9	150	253

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

For PK:

1GHz-3GHz: 50dBuV

3GHz-14GHz: 54dBuV

14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV

3GHz-14GHz: 46dBuV

14GHz-26.5GHz: 46.5dBuV



EUT : XG-950

Test Condition : 802.11g (OFDM modulation) Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
4076	PK	V	31.88	34.59	44.83	47.54	74	-26.46	109	228
4076	AV	V	31.88	34.59	37.79	40.50	54	-13.50	109	228
4076	PK	H	31.88	34.59	42.30	45.01	74	-28.99	151	210
4076	AV	H	31.88	34.59	33.36	36.07	54	-17.93	151	210

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

For PK:

1GHz-3GHz: 50dBuV

3GHz-14GHz: 54dBuV

14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV

3GHz-14GHz: 46dBuV

14GHz-26.5GHz: 46.5dBuV



EUT : XG-950

Test Condition : 802.11g (OFDM modulation) Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
4126	PK	V	31.88	34.59	50.27	52.98	74	-21.02	104	146
4126	AV	V	31.88	34.59	46.17	48.88	54	-5.12	104	146
2063	PK	V	33.74	29.36	56.72	52.34	74	-21.66	149	295
2063	AV	V	33.74	29.36	47.27	42.89	54	-11.11	149	295
4126	PK	H	31.88	34.59	48.77	51.48	74	-22.52	185	227
4126	AV	H	31.88	34.59	43.14	45.85	54	-8.15	185	227

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

For PK:

1GHz-3GHz: 50dBuV

3GHz-14GHz: 54dBuV

14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV

3GHz-14GHz: 46dBuV

14GHz-26.5GHz: 46.5dBuV



EUT : XG-950

Test Condition : 802.11g (OFDM modulation) Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
4176	PK	V	31.88	34.59	48.53	51.24	74	-22.76	175	130
4176	AV	V	31.88	34.59	44.16	46.87	54	-7.13	175	130
2088	PK	H	33.74	29.36	59.03	54.65	74	-19.35	134	229
2088	AV	H	33.74	29.36	48.94	44.56	54	-9.44	134	229
4176	PK	H	31.88	34.59	46.93	49.64	74	-24.36	152	137
4176	AV	H	31.88	34.59	40.33	43.04	54	-10.96	152	137

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

For PK:

1GHz-3GHz: 50dBuV

3GHz-14GHz: 54dBuV

14GHz-26.5GHz: 60dBuV

For AV:

1GHz-3GHz: 41.5dBuV

3GHz-14GHz: 46dBuV

14GHz-26.5GHz: 46.5dBuV



6. Power Spectrum Density test

6.1 Operating environment

Temperature: 25 °C
Relative Humidity: 56 %
Atmospheric Pressure 1023 hPa

6.2 Test setup & procedure

The power spectrum density per FCC § 15.247(d) was measured from the antenna port of the EUT using a 50ohm spectrum analyzer with the resolution bandwidth set at 3kHz, the video bandwidth set at 10kHz, a span of 1.5 MHz, and the sweep time set at 500 seconds. Power Density was read directly and cable loss (2.13dB)/external attenuator (10dB) correction was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel). The Power Spectral Density measured result is in the following table.

6.3 Measured data of Power Spectrum Density test results

Test Condition: 802.11b operation (DSSS modulation)

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2413.905	-11.05	8
Middle	2433.689	-11.65	8
High	2463.908	-12.02	8

Test Condition: 802.11g operation (OFDM modulation)

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2417.616	-13.87	8
Middle	2437.952	-14.32	8
High	2465.755	-13.64	8

Please see the plot below



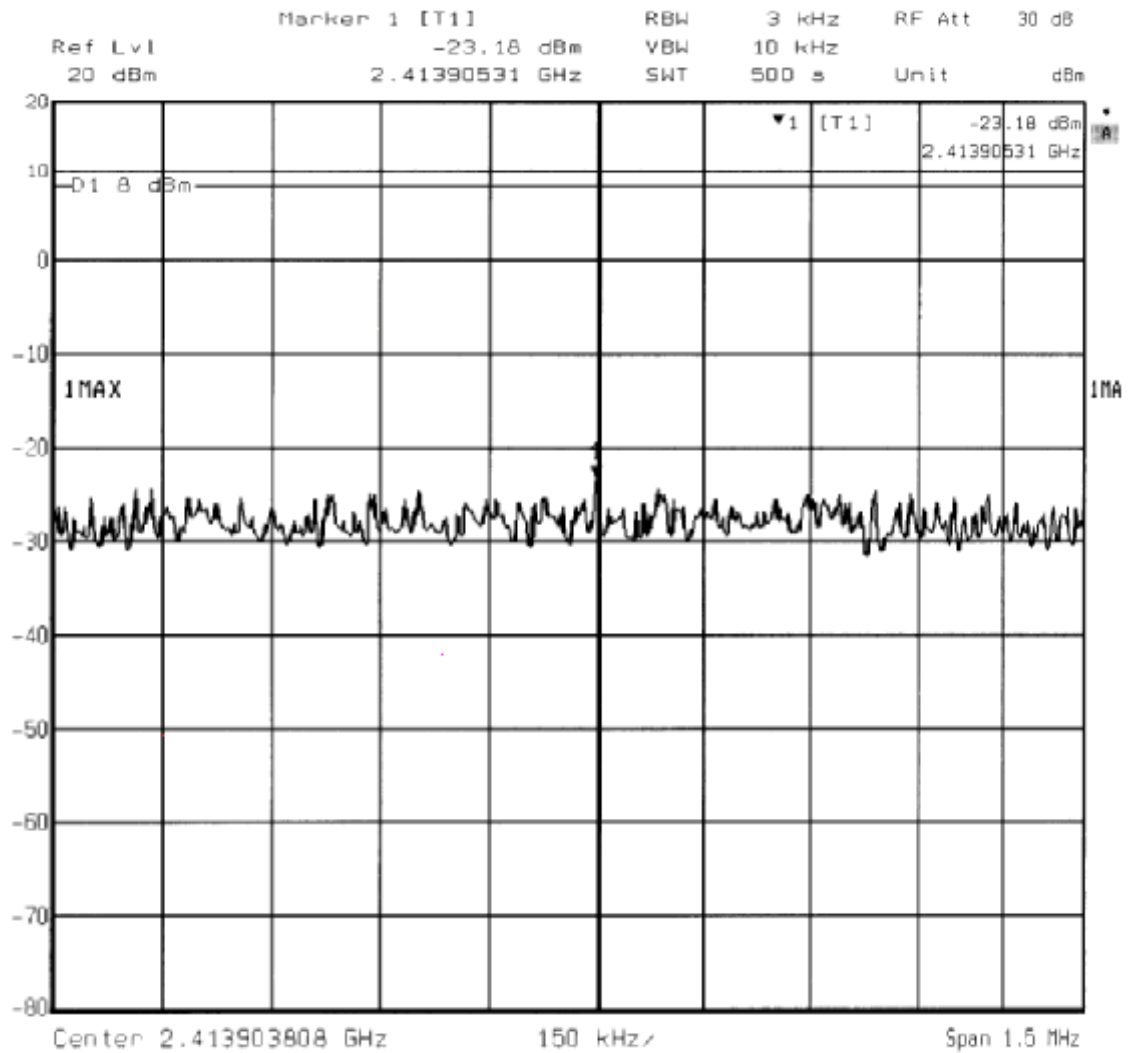
Intertek Testing Services

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Comment A: Power spectrum density at low channel
CL=2.13 (EC365)(802.11b) ATT=10dB



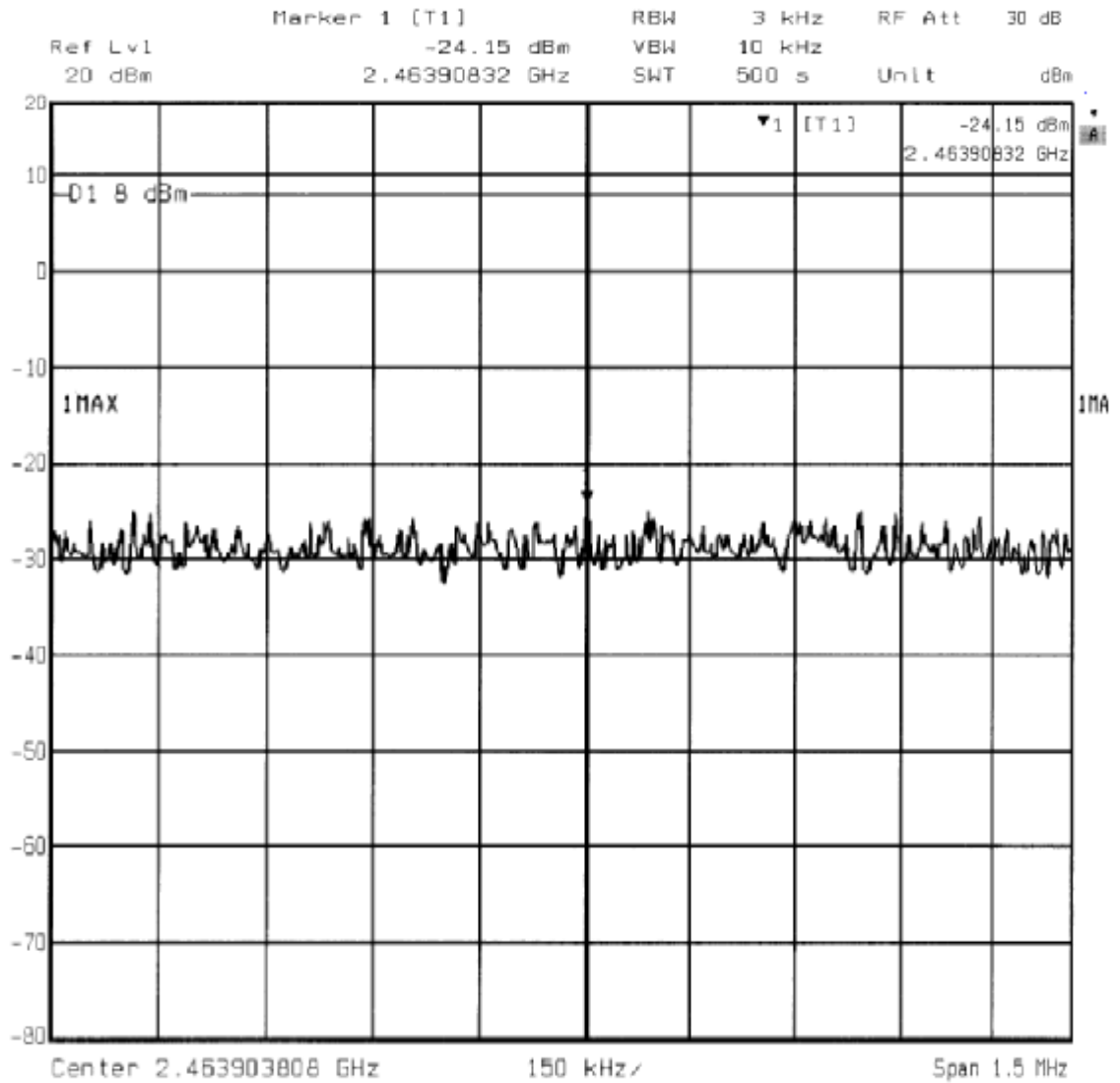
Intertek Testing Services

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FCC ID. : M4Y-0XG950

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Comment A: Power spectrum density at high channel
CL=2.13 (EC365)(802.11b) ATT=10dB



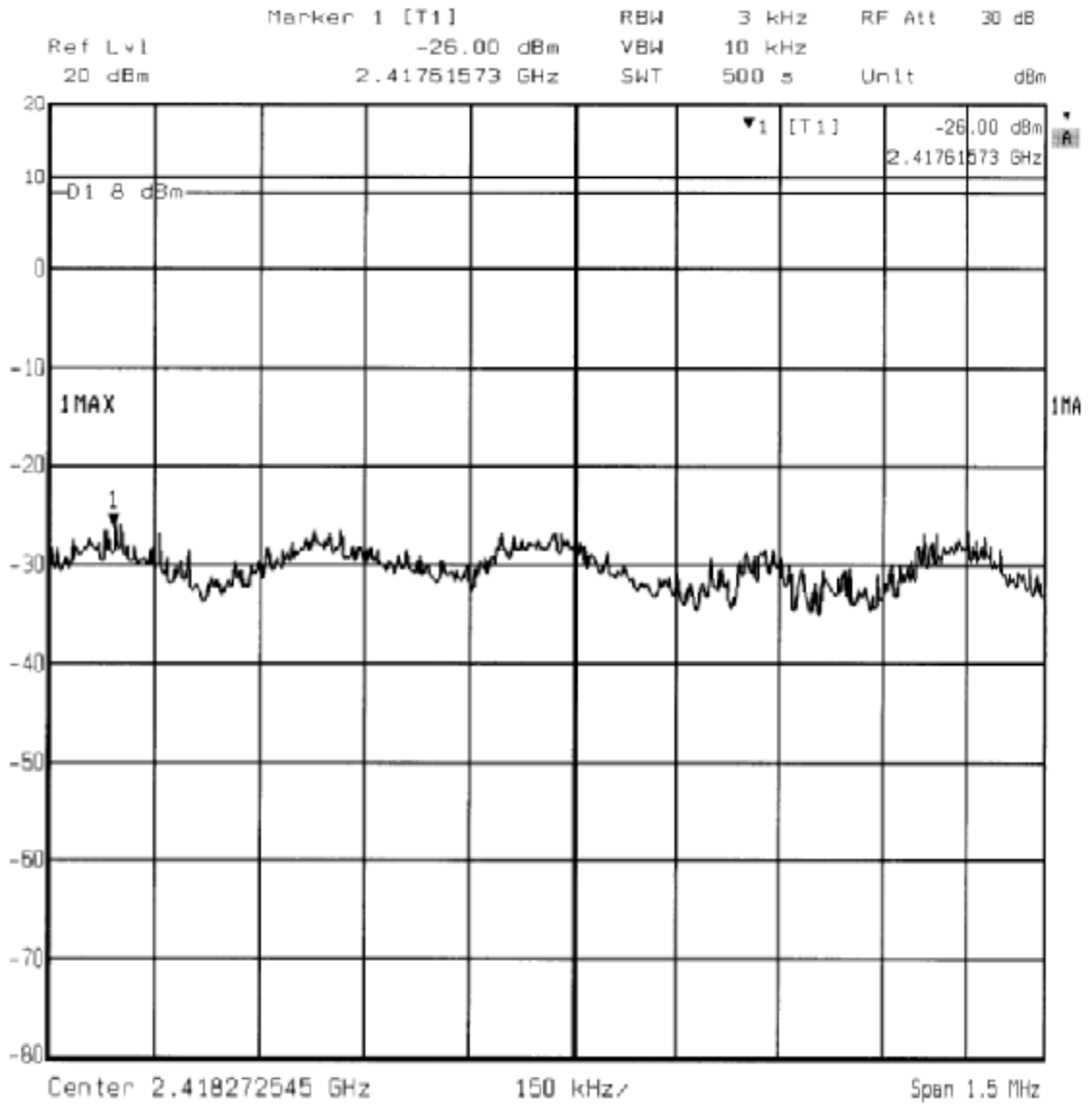
Intertek Testing Services

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Comment A: Power spectrum density at low channel
CL=2.13 (EC365)(802.11g) ATT=10dB



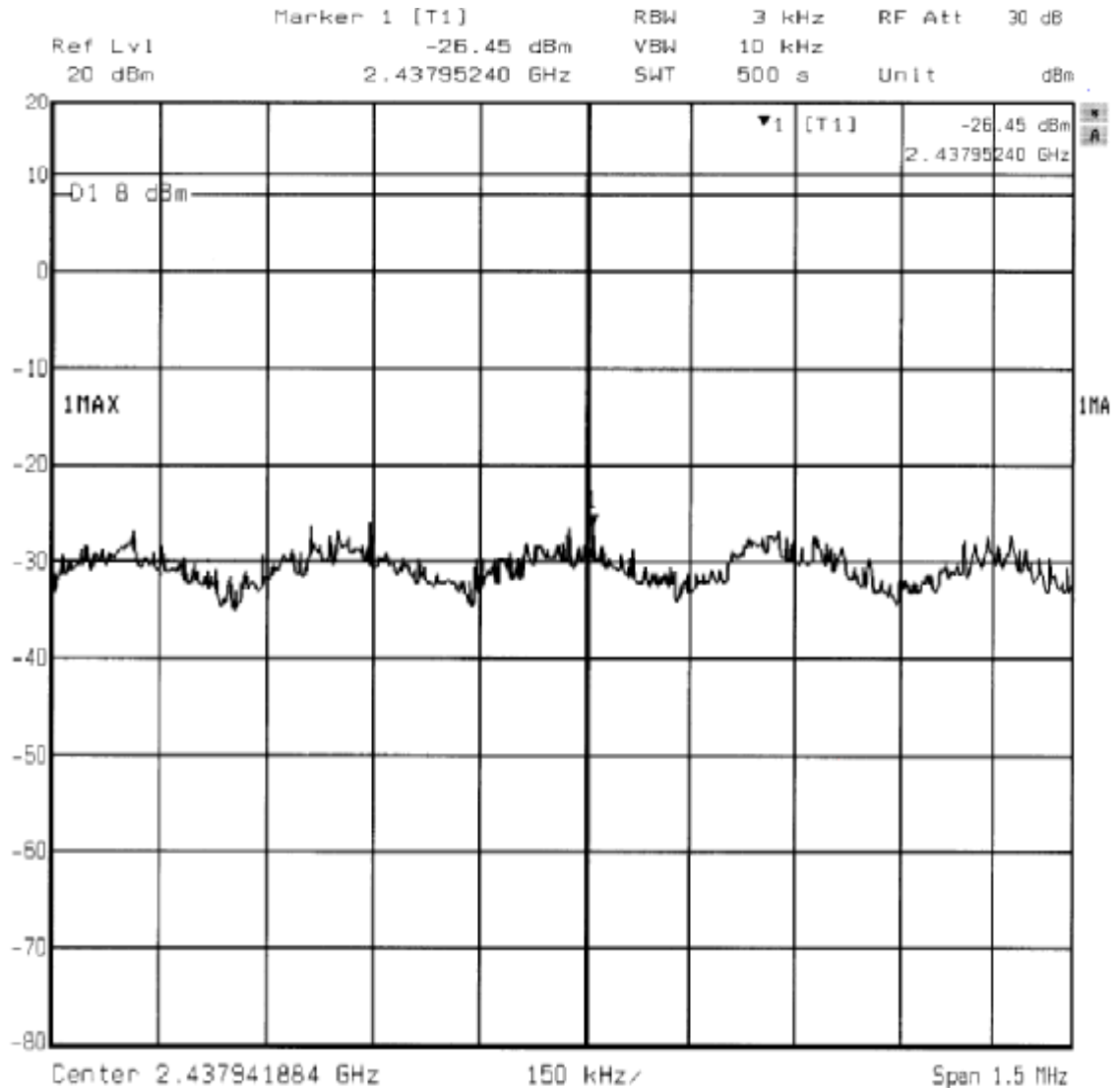
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Comment A: Power spectrum density at middle channel

CL=2.13 (EC365)(802.11g) ATT=10dB



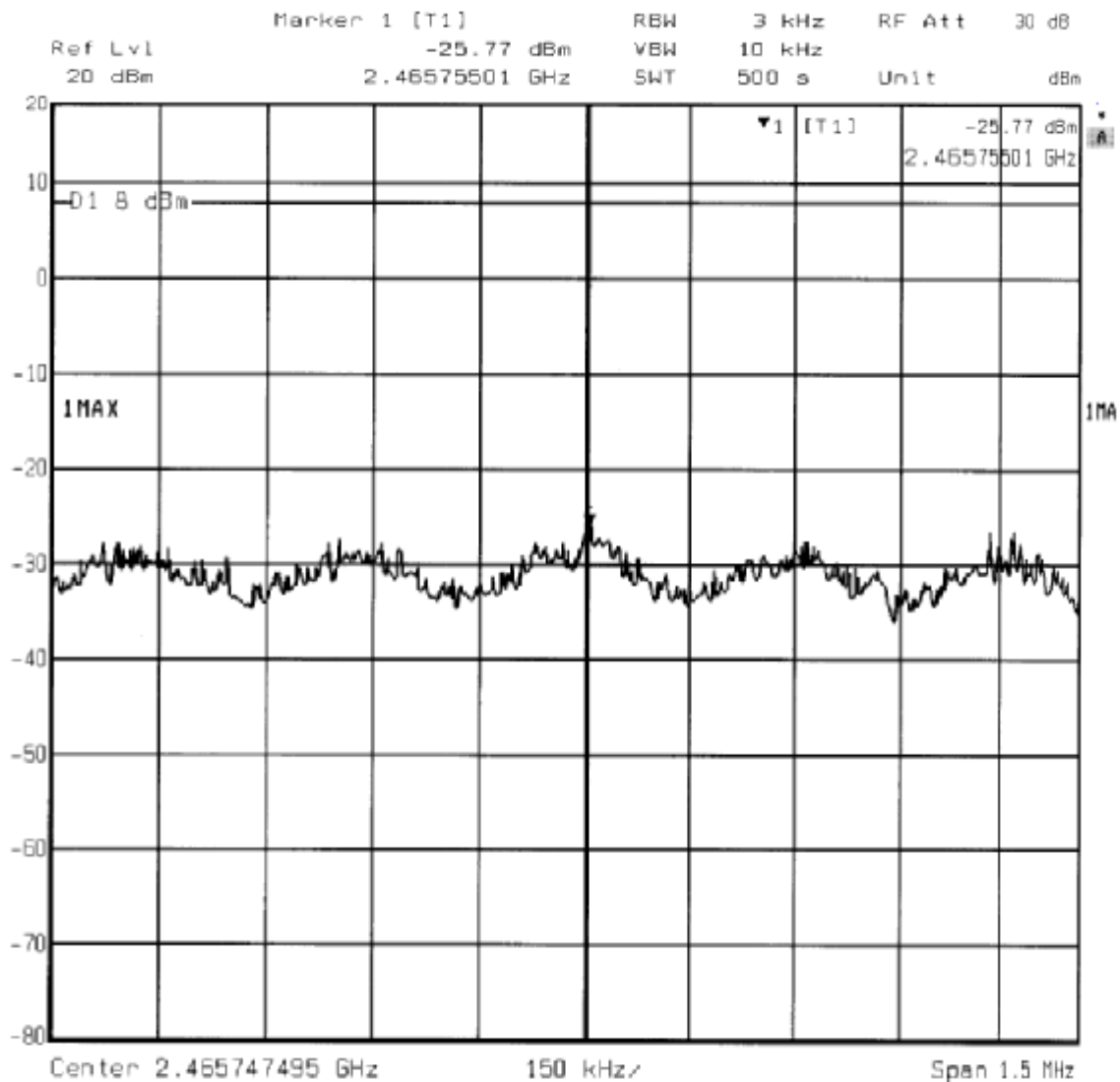
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Comment A: Power spectrum density at high channel

ATT=3dB CL=2.13 (EC365)(802.11g) ATT=1dB.



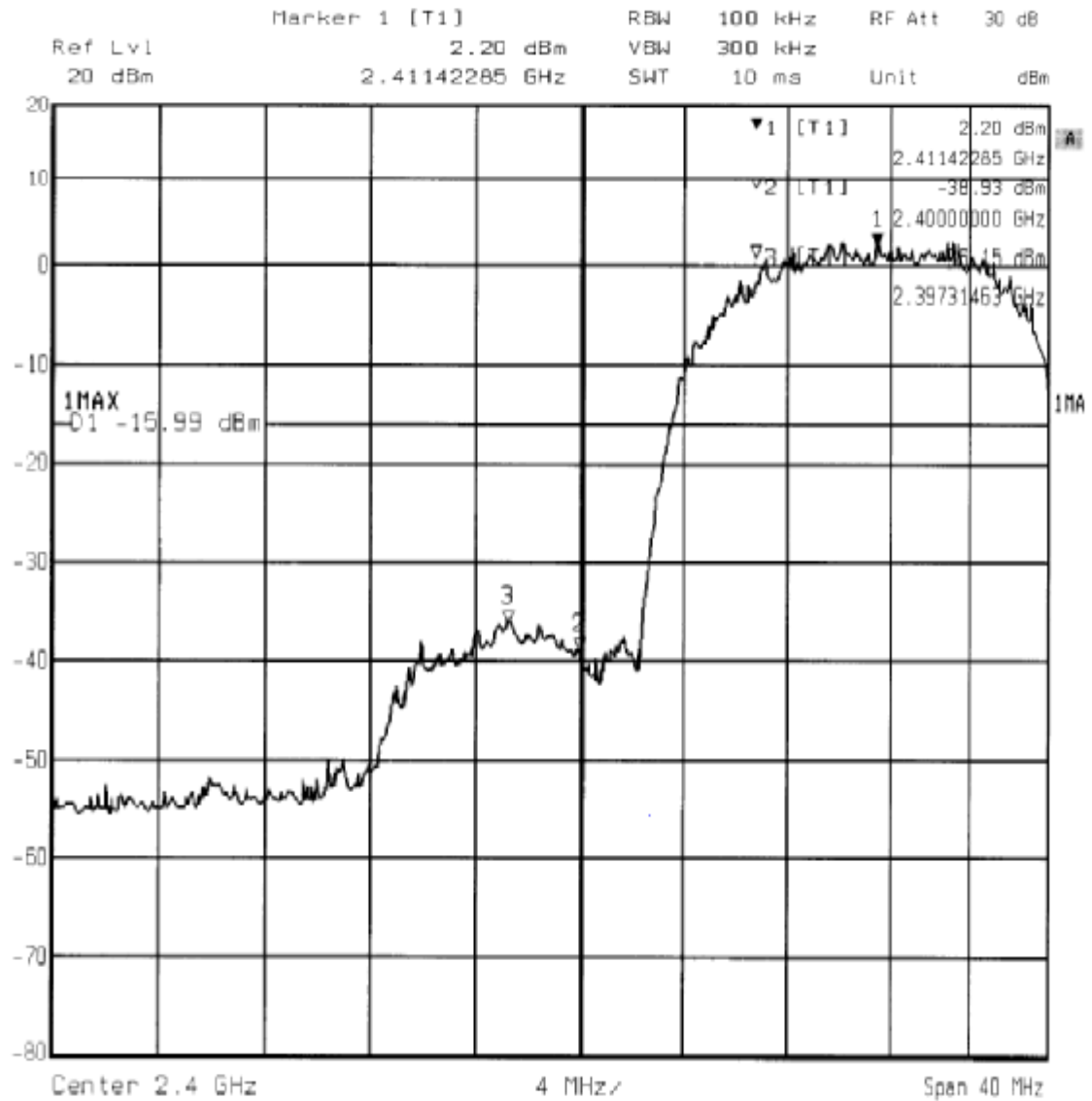
7. Emission on the band edge §FCC 15.247(C)

In any 100kHz bandwidth outside the frequency band in which the spread spectrum 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.

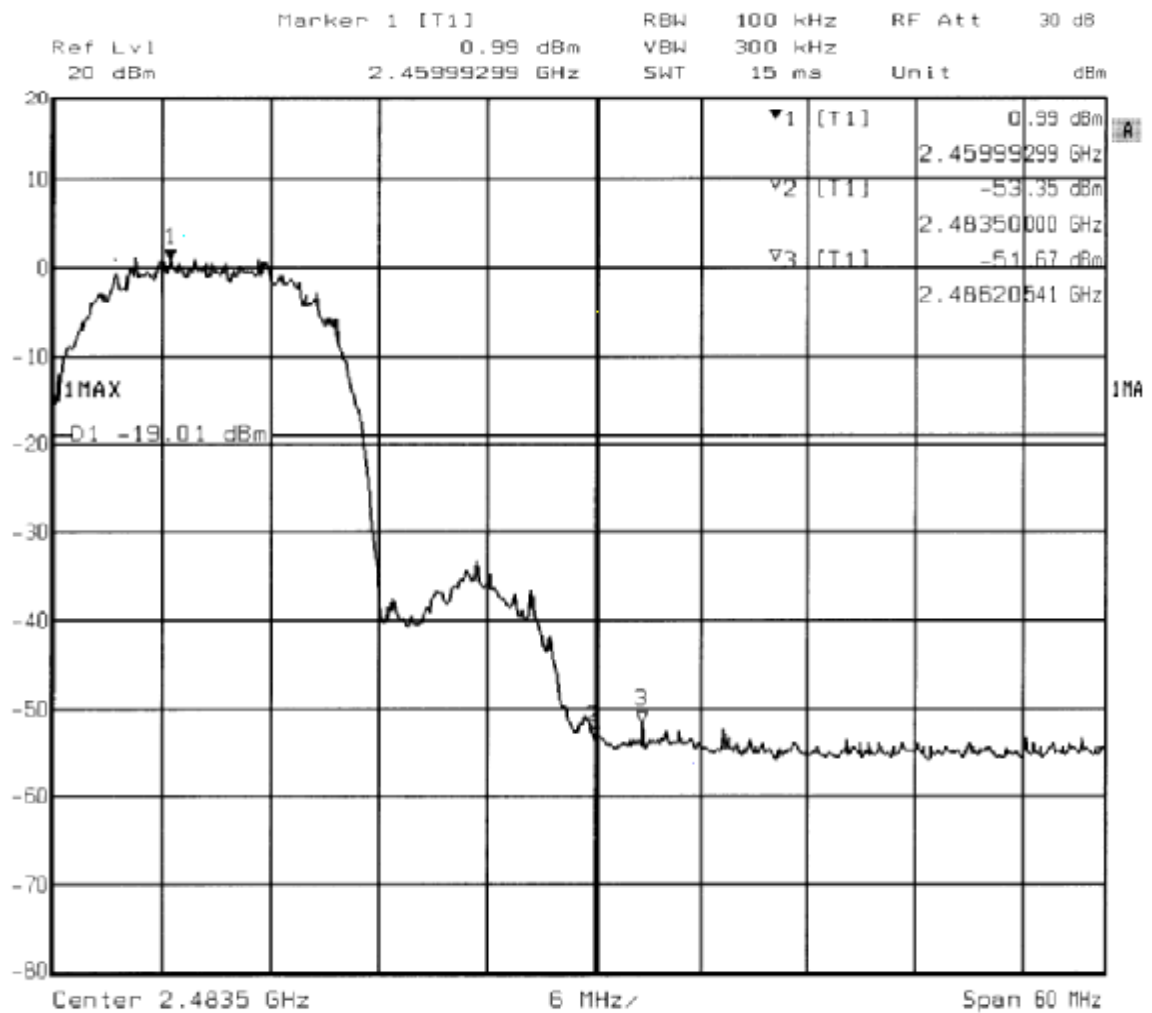
Please see the plot below.



7.1 Band-edge (Conducted method)



Comment A: Band-edge at low channel



Comment A: Band-edge at high channel



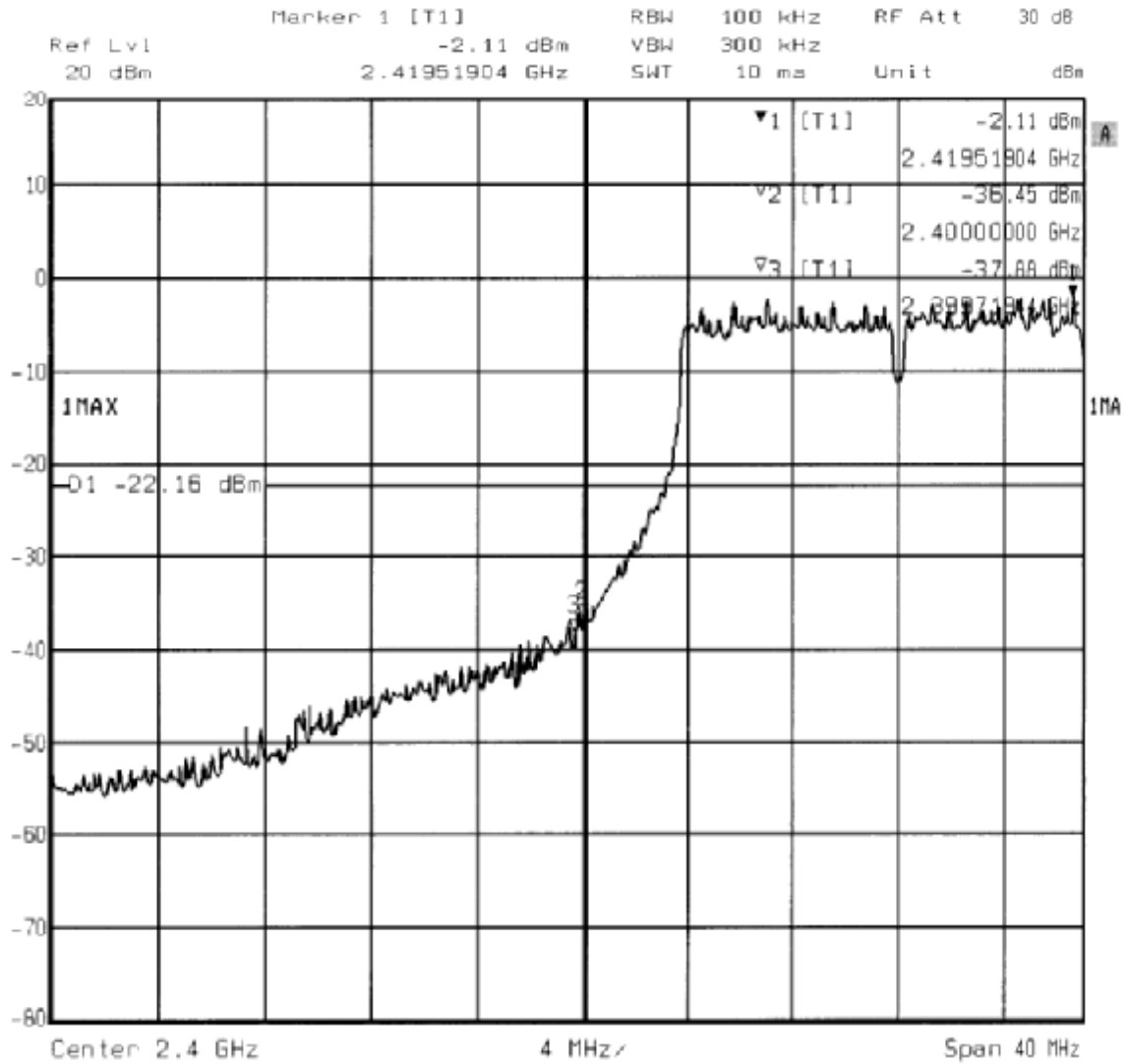
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Comment A: 802.11g Band-edge at low channel



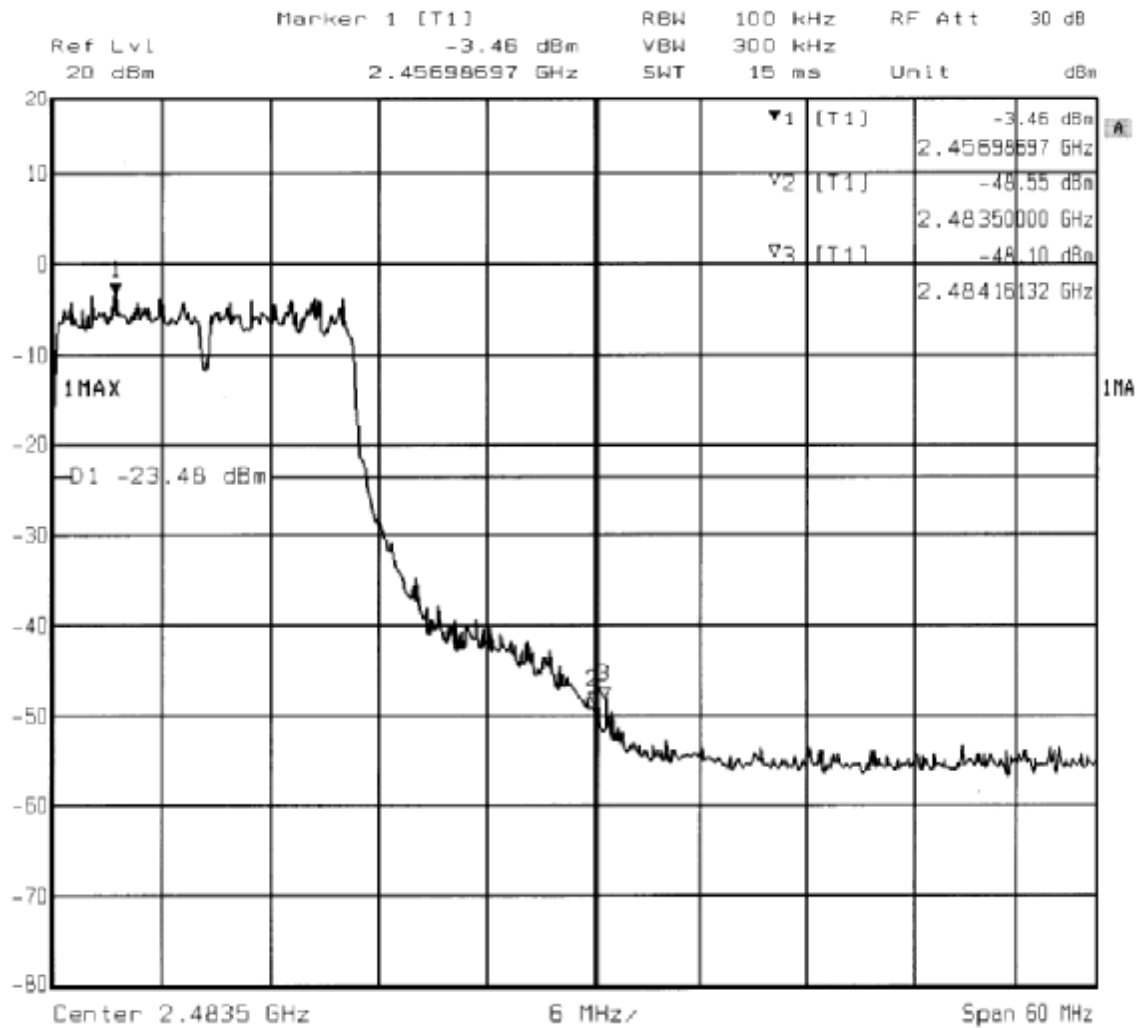
Intertek Testing Services

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FCC ID. : M4Y-0XG950

Report No.: EME-030876

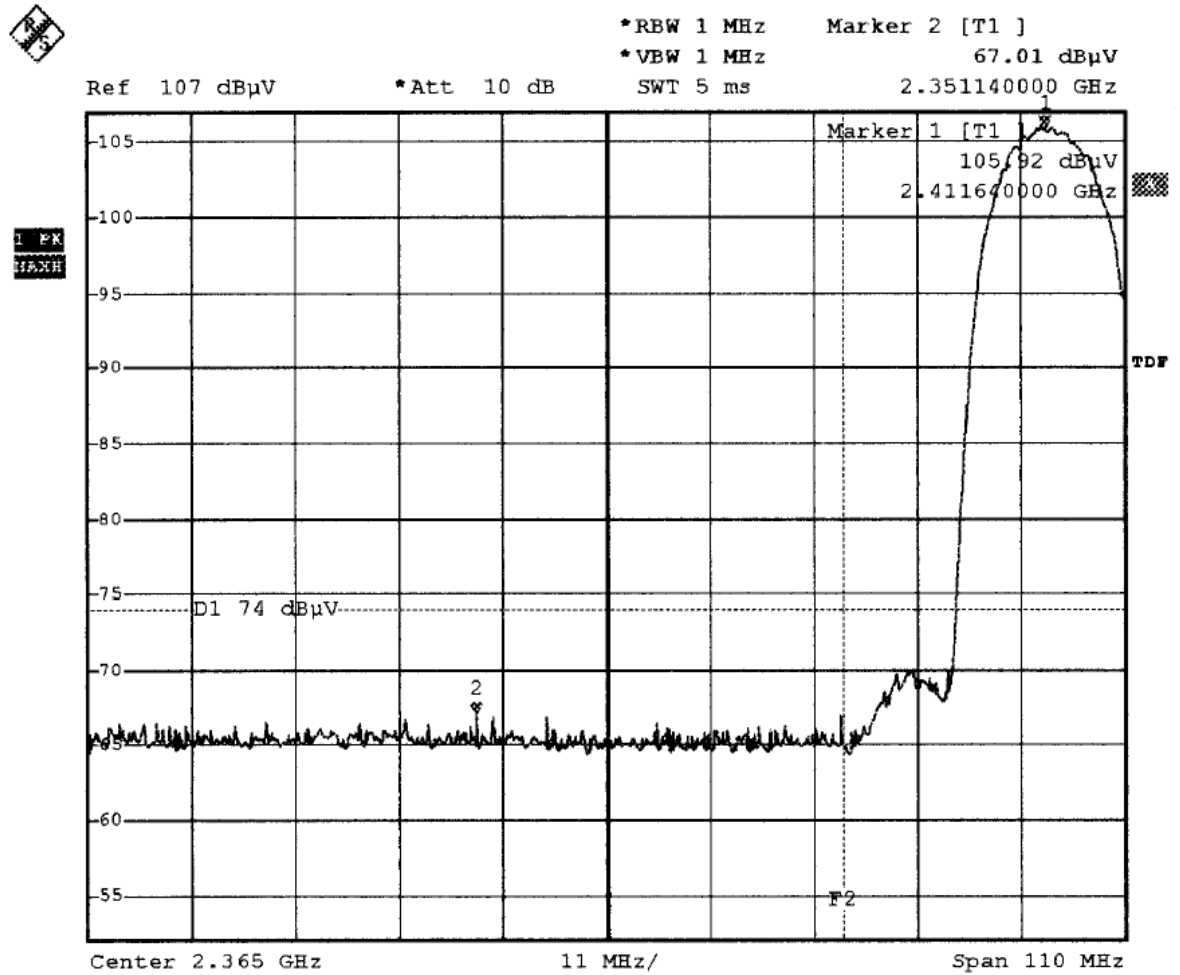
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Comment A: 802.11g Band-edge at high channel



7.2 Band-edge (Radiated method)



Comment A: 802.11b Band-edge test at low channel
Peak detector F2=2390MHz



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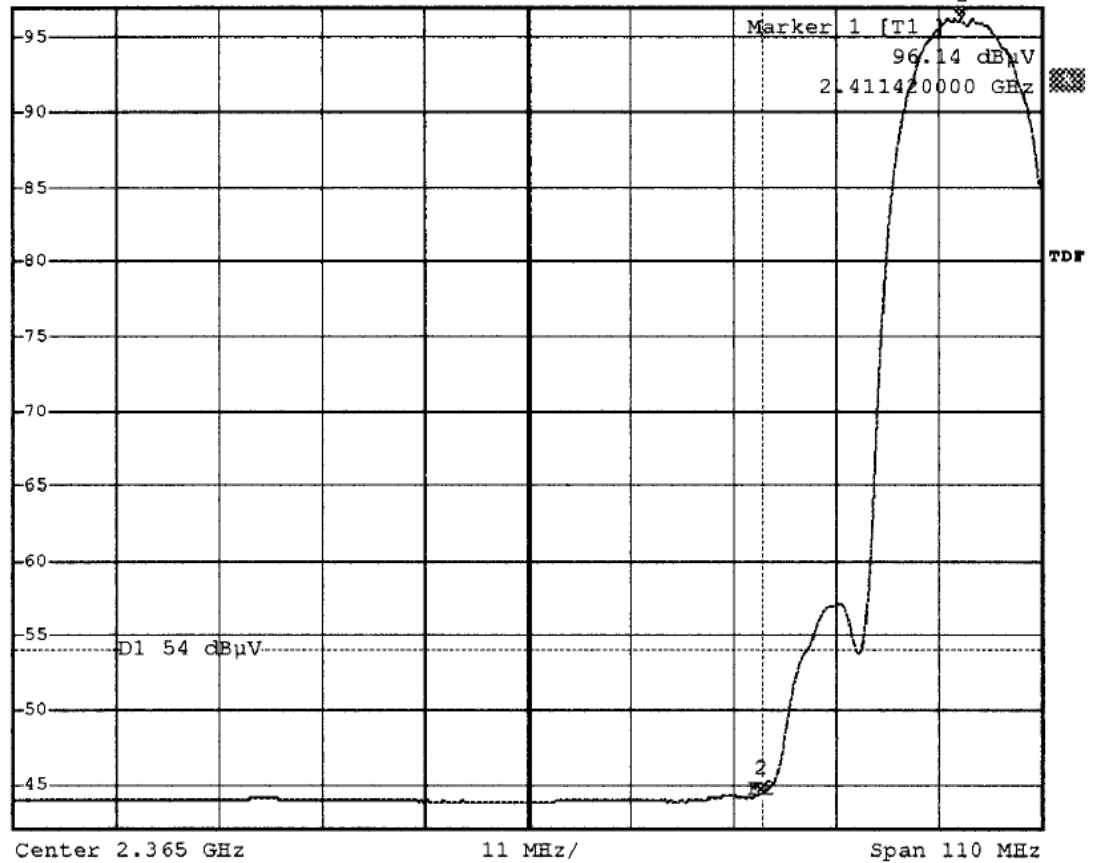


*RBW 1 MHz Marker 2 [T1]
*VBW 10 Hz 44.31 dBμV
SWT 28 s 2.389860000 GHz

Ref 97 dBμV

*Att 0 dB

1 PK
11.2 MHz



Comment A: 802.11b Band-edge test at low channel
Average detector F2=2390MHz



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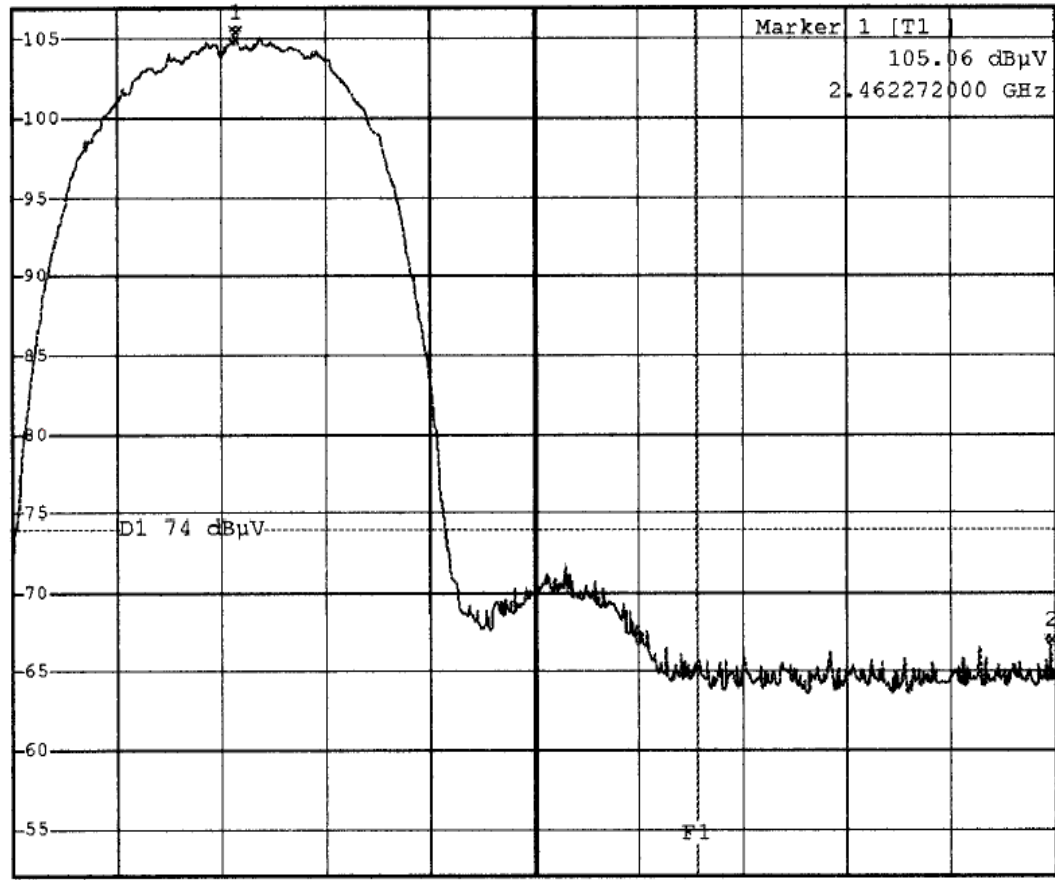


*RBW 1 MHz Marker 2 [T1]
*VBW 1 MHz 66.57 dBμV
SWT 2.5 ms 2.499808000 GHz

Ref 107 dBμV

*Att 10 dB

1 PK
MAXH



Start 2.452 GHz

4.8 MHz/

Stop 2.5 GHz

Comment A: 802.11b Band-edge test at high channelareÇ
Peak detector F1=2483.5MHz



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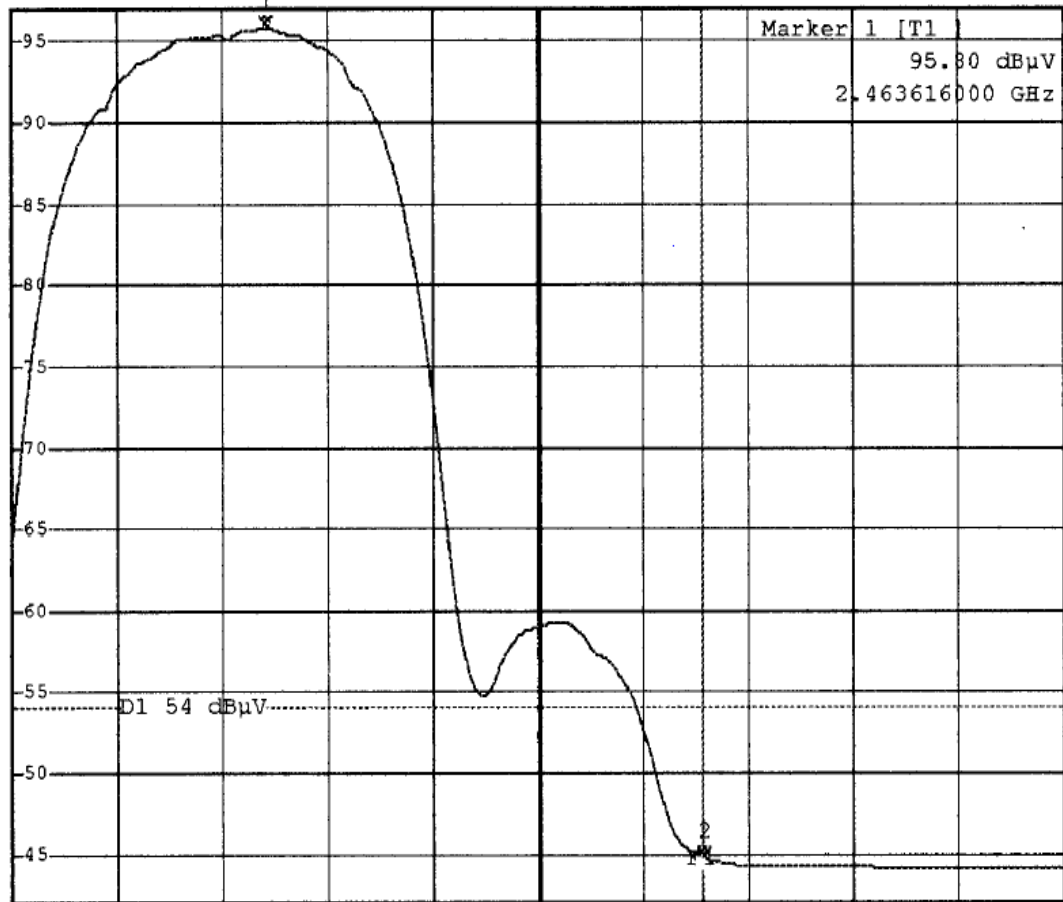


*RBW 1 MHz Marker 2 [T1]
*VBW 10 Hz 44.74 dBμV
SWT 12 s 2.483584000 GHz

Ref 97 dBμV

*Att 0 dB

1 FM
TAXH



Start 2.452 GHz

4.8 MHz/

Stop 2.5 GHz

Comment A: 802.11b Band-edge test at high channelN(
Average detector F1=2483.5MHz



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*RBW 1 MHz

Marker 2 [T1]

*VBW 1 MHz

66.87 dBμV

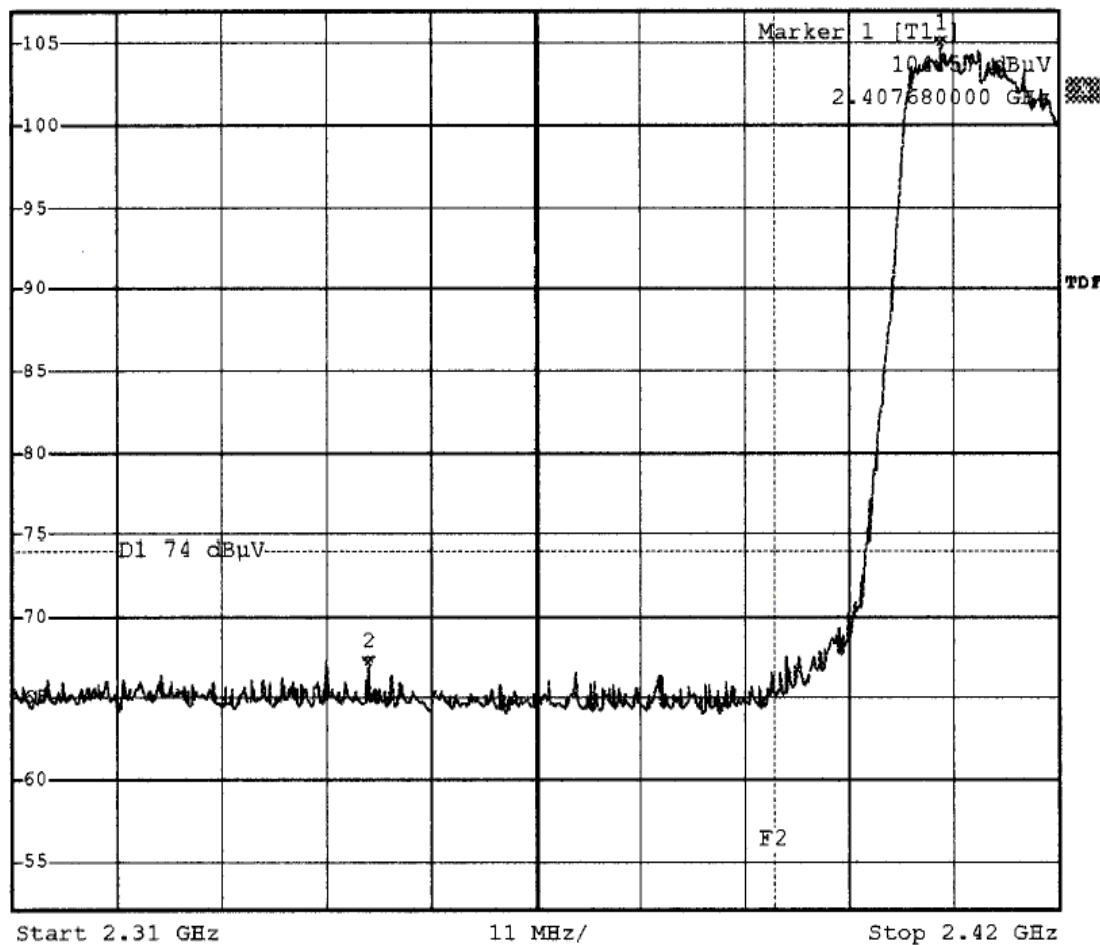
Ref 107 dBμV

*Att 10 dB

SWT 5 ms

2.347400000 GHz

1 PK
MAX



Comment A: 802.11g Band-edge test at low channel 4N{
Peak detector F2=2390MHz



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*RBW 1 MHz

Marker 2 [T1]

*VBW 10 Hz

45.04 dBμV

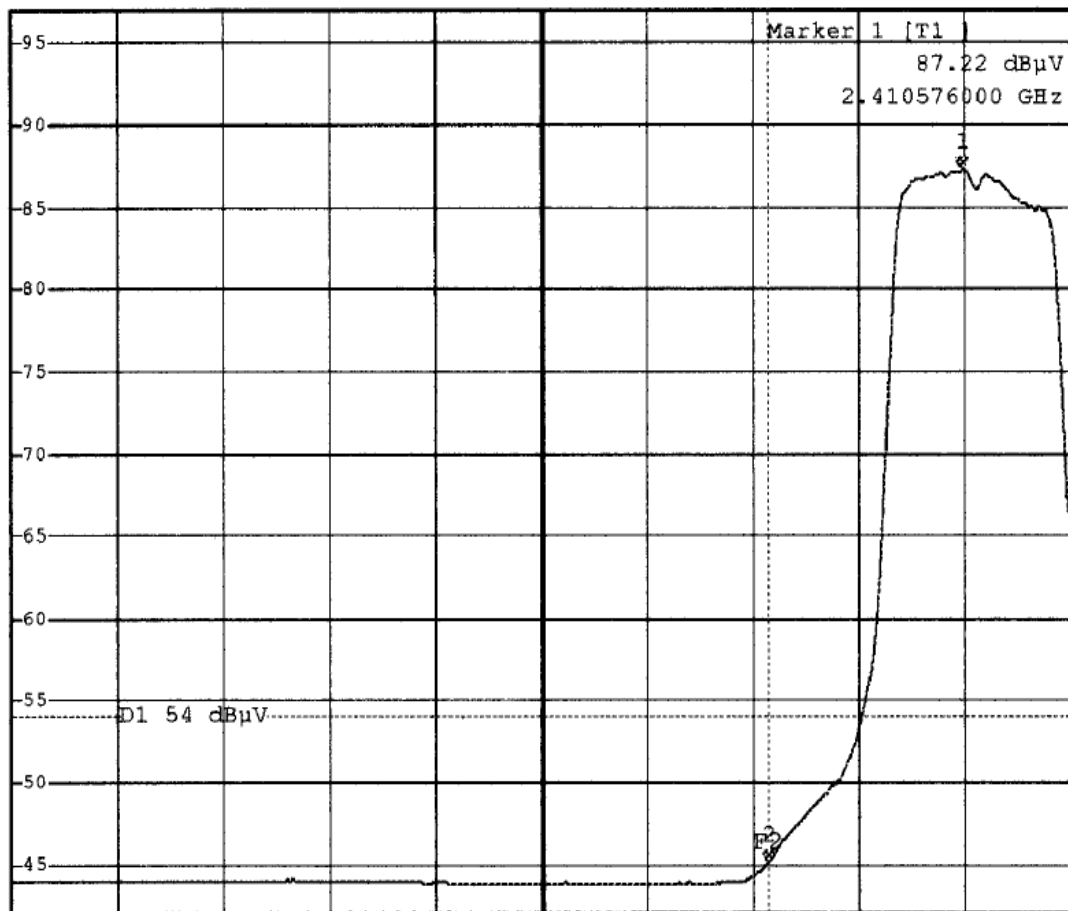
SWT 28 s

2.389968000 GHz

Ref 97 dBμV

*Att 0 dB

1 PK
MAXH



Start 2.31 GHz

11.2 MHz/

Stop 2.422 GHz

Comment A: 802.11g Band-edge test at low channel
Average detector F2=2390MHz



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FCC ID. : M4Y-0XG950

Report No.: EME-030876

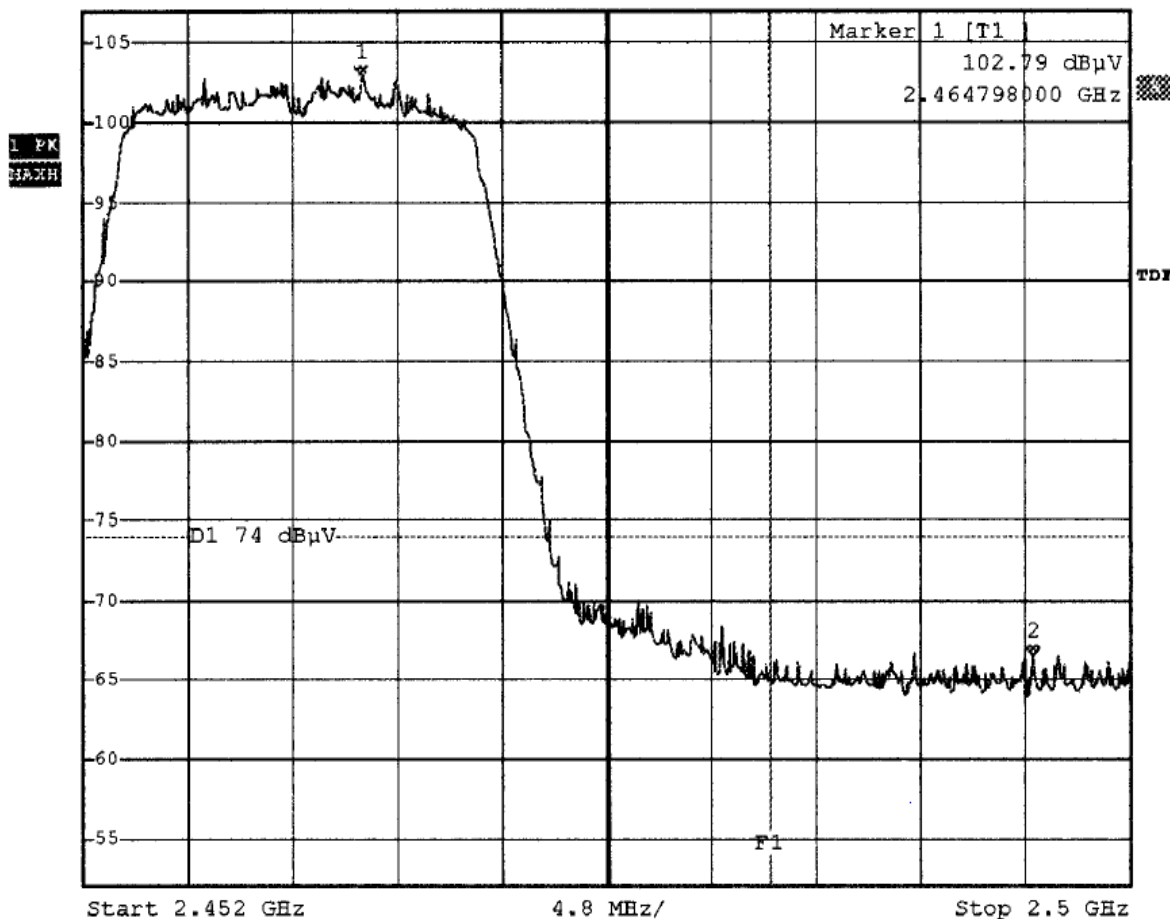
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*RBW 1 MHz Marker 2 [T1]
*VBW 1 MHz 66.36 dBμV
SWT 2.5 ms 2.495584000 GHz

Ref 107 dBμV

*Att 10 dB



Comment A: 802.11g Band-edge test at high channelare\Rohde&Schwarz\FSE
Peak detector F1=2483.5MHz



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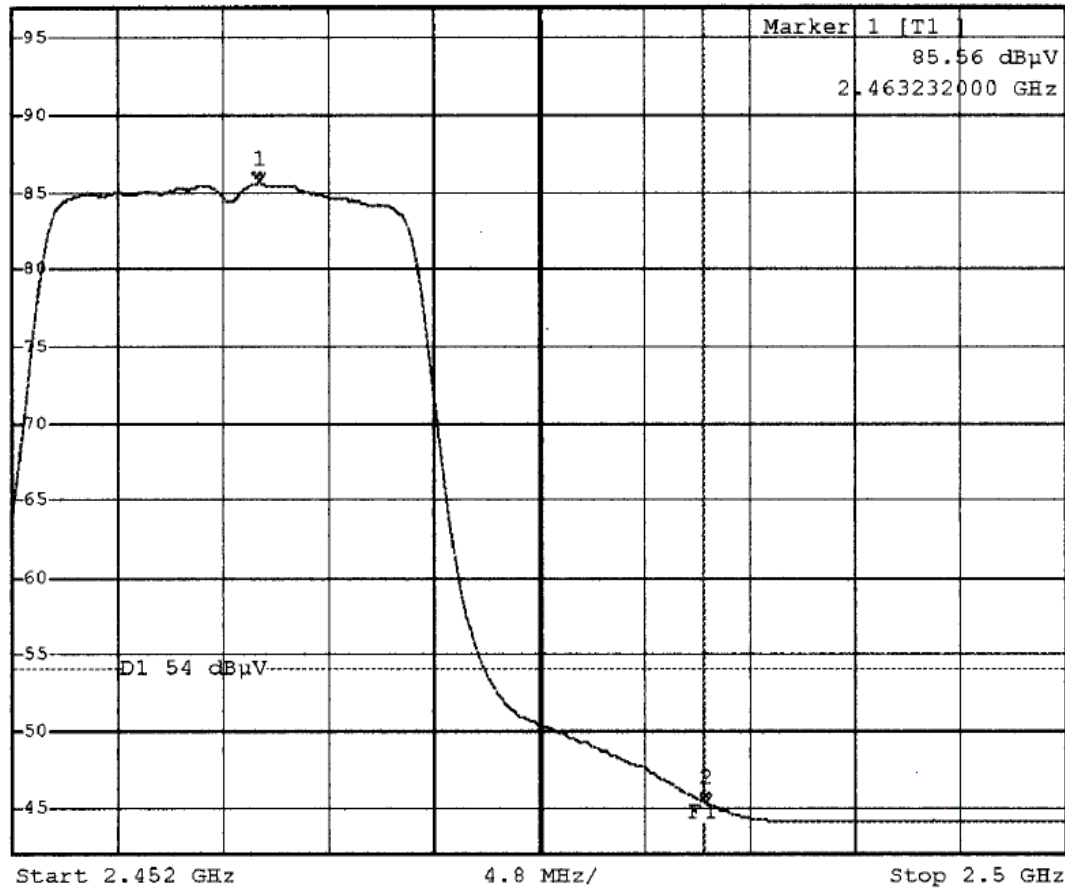


*RBW 1 MHz Marker 2 [T1]
*VBW 10 Hz 45.25 dBμV
SWT 12 s 2.483584000 GHz

Ref 97 dBμV

*Att 0 dB

1 FX
MAX



Comment A: 802.11g Band-edge test at high channelare\Rohde&Schwarz\FP
Average detector F1=2483.5MHz

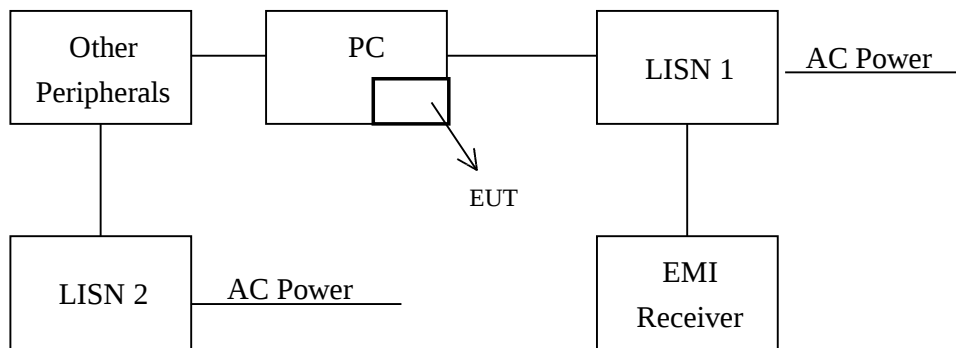


8. Power Line Conducted Emission test §FCC 15.207

8.1 Operating environment

Temperature:	24	°C	(10-40°C)
Relative Humidity:	70	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1061hPa)

8.2 Test setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/1992 on conducted measurement. The AC power conducted emissions was investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz. (15.207 paragraph)

The EUT configuration please refer to the “Conducted set-up photo.pdf”.



Emission Limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.



8.3 Power Line Conducted Emission test data

(1) Line

EUT : XG-950

Worst Case Condition : 802.11b (DSSS modulation) Tx at low channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.23000	35.00	62.45	33.10	52.45	-27.45	-19.35
0.35000	31.60	58.96	30.80	48.96	-27.36	-18.16
2.30200	33.30	56.00	30.40	46.00	-22.70	-15.60
4.59800	35.00	56.00	31.90	46.00	-21.00	-14.10
6.94200	41.00	60.00	36.80	50.00	-19.00	-13.20
15.01400	41.10	60.00	36.60	50.00	-18.90	-13.40

(2) Neutral

EUT : XG-950

Test Condition : 802.11b (DSSS modulation) Tx at low channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.19000	26.60	64.04	23.80	54.04	-37.44	-30.24
0.23000	32.20	62.45	26.50	52.45	-30.25	-25.95
2.30200	33.10	56.00	30.60	46.00	-22.90	-15.40
4.59800	35.10	56.00	31.60	46.00	-20.90	-14.40
6.94200	40.80	60.00	36.80	50.00	-19.20	-13.20
14.96600	42.20	60.00	36.60	50.00	-17.80	-13.40

Remark:

1. Margin Value = Reading level - Limit value
2. The emission level of other frequency were very low against the limit

Please see the plot below.



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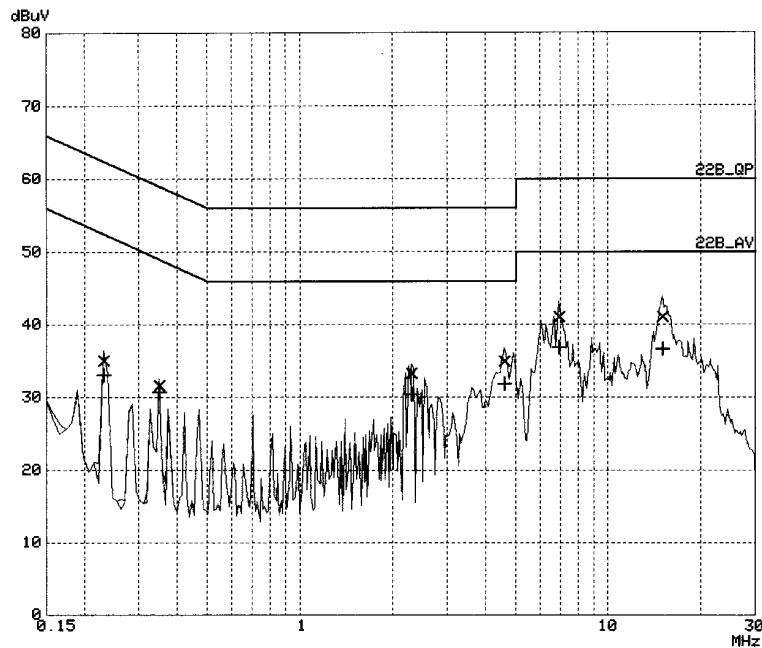
RF Voltage

EUT: XG-950
Manuf: Z-COM
Op Cond: LISN-L
Operator: Kevin
Test Spec: FCC Class B
Comment: EMI Rx : EC303 LISN : EC320
120V 60Hz 24°C 70%RH 802.11b tx low channel
File name: 11BLOWL.RES
Date: 24. Jul 03 10:24

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	8k	9k	PK	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s





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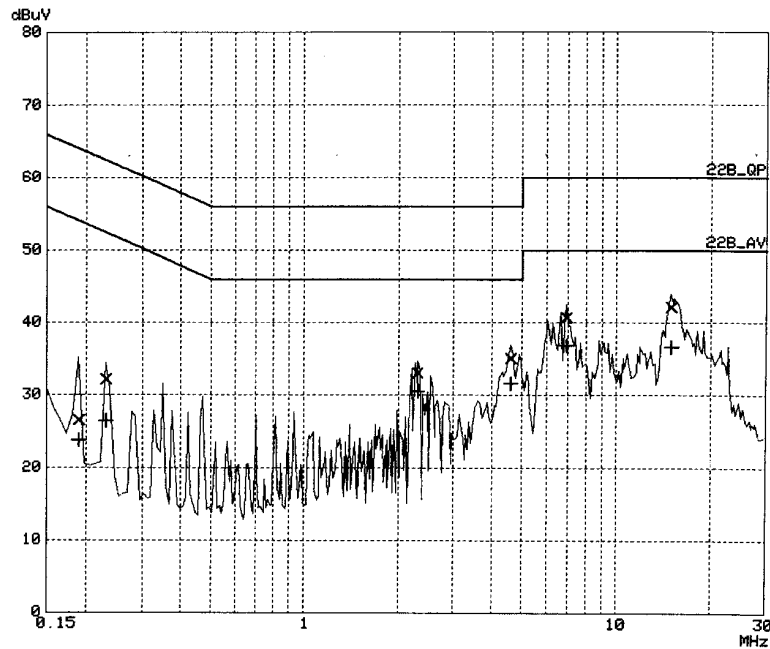
RF Voltage

EUT: XG-950
Manuf: Z-COM
Op Cond: LISN-N
Operator: Kevin
Test Spec: FCC Class B
Comment: EMI Rx : EC303 LISN : EC320
120V 60Hz 24°C 70%RH 802.11b tx low channel
File name: 11BLOWN.RES
Date: 24. Jul 03 10:07

Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	30M	8k	9k	PK	20ms AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s





(1) Line

EUT : XG-950

Worst Case Condition : 802.11g (OFDM modulation) Tx at high channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.23000	35.10	62.45	33.20	52.45	-27.35	-19.25
0.35000	31.70	58.96	30.90	48.96	-27.26	-18.06
2.30300	32.10	56.00	29.10	46.00	-23.90	-16.90
4.59800	35.10	56.00	32.20	46.00	-20.90	-13.80
6.94200	41.10	60.00	36.60	50.00	-18.90	-13.40
14.96600	12.20	60.00	7.10	50.00	-47.80	-42.90

(2) Neutral

EUT : XG-950

Worst Case Condition : 802.11g (OFDM modulation) Tx at high channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.23000	32.30	62.45	26.60	52.45	-30.15	-25.85
0.35000	30.30	58.96	29.80	48.96	-28.66	-19.16
2.30200	33.50	56.00	30.40	46.00	-22.50	-15.60
4.59800	35.00	56.00	32.20	46.00	-21.00	-13.80
6.94200	41.00	60.00	36.50	50.00	-19.00	-13.50
14.99600	13.20	60.00	8.20	50.00	-46.80	-41.80

Remark:

1. Margin Value = Reading level - Limit value
2. The emission level of other frequency were very low against the limit

Please see the plot below.



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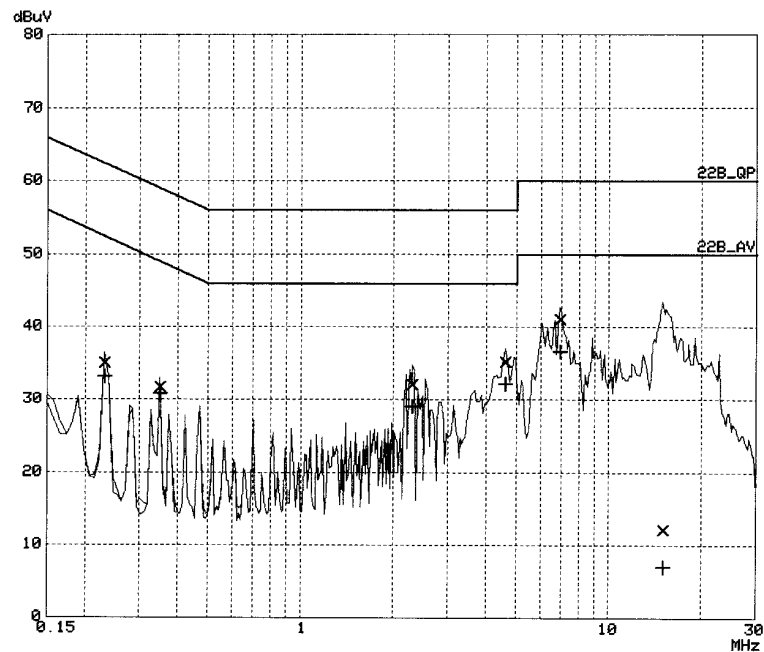
RF Voltage

EUT: XG-950
Manuf: Z-COM
Op Cond: LISN-L
Operator: Kevin
Test Spec: FCC Class B
Comment: EMI Rx : EC303 LISN : EC320
120V 60Hz 24'C 70%RH 802.11g tx hIgh channel
File name: 11GHIGHL.RES
Date: 24. Jul 03 10:53

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	8k	9k	PK	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s





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RF Voltage

EUT: XG-950
Manuf: Z-COM
Op Cond: LISN-N
Operator: Kevin
Test Spec: FCC Class B
Comment: EMI Rx : EC303 LISN : EC320
120V 60Hz 24'C 70%RH 802.11g tx high channel
File name: 11GHIGHN.RES
Date: 24. Jul 03 10:59

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	8k	9k	PK	20ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s

