



No. DAT-P-114/01-01



TESTING
CNAS L0442

TEST REPORT

No. 2009WLN0212

Product name **HSPA USB ADAPTER**

Model **MF10**

Client **ZTE Corporation**

Classification of test **Type Approval**

Telecommunication Metrology Center
of Ministry of Industry and Information Technology

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Product name	HSPA USB ADAPTER	Sample Model	MF10
Client	ZTE Corporation	Type of test	type approval
Factory	ZTE Corporation	Sampling arrival date	2009-08-03
Manufacturer	ZTE Corporation		
Sampling/ Sending sample	Sending sample	Sample sent by	/
Sampling location	/	Sampling person	/
Sample quantity	2	Sample matrix	/
Series number of the Sample	/		
Manufacture date	/	Manufacture location	Shenzhen
Test basis	FCC Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits; general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz. ANSI C63.4 - 2003 KDB558074 Measurement of Digital Transmission Systems Operating under Section 15.247		
Test conclusion	Pass 6 test cases were done. The test results are shown in the clause 6 and annex B. The sample(s) passed all the tests required by the client. Date of issue: 2009-09-21		
Note	The test results relate only to the items tested of the sample(s).		

Approved by 陆冰松 (Lu Bingsong)
 Reviewed by 高洪 (Gao Hong)
 Tested by 孙震宇 (Sun Zhenyu)

(Lu Bingsong - Deputy Director of the laboratory)

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1. COMPETENCE AND WARRANTIES

Telecommunication Metrology Center of Ministry of Industry and Information Technology is a test laboratory accredited by DAR (DATEch) - Deutschen Akkreditierungs Rat (The German Accreditation Body Technology) for the tests indicated in the Certificate No. **DAT-P-114/01-01**.

Telecommunication Metrology Center of Ministry of Industry and Information Technology is a test laboratory accredited by CNAS - China national Accreditation Service for Conformity Assessment, for the tests indicated in the Certificate No. **L0442**.

Telecommunication Metrology Center of Ministry of Industry and Information Technology (hereinafter TMC of MIIT) is a test laboratory competent to carry out the tests described in this test report.

TMC of MIIT guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at **TMC of MIIT** at the time of execution of the test.

TMC of MIIT is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test.

2. TESTING LABORATORY

2.1. Testing Location

Name of Company :	Telecommunication Metrology Center of Ministry of Industry and Information Technology
Address:	No 52, Hua Yuanbei Road, Haidian District, Beijing, P.R.China
Postal Code:	100191
Telephone:	+86-10-62302041
Fax:	+86-10-62304793

2.2. Testing Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Shielding Room2 (7.30 meters×4.00 meters×3.80 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

2.3. Testing Period

The performed test started on 5th August, 2009 and finished on 18th September, 2009.

3. APPLICANT INFORMATION

3.1. Client information

Name of Company:	ZTE Corporation
Address /Post:	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China
City:	Shenzhen
Postal Code:	518057
Country:	China
Telephone:	+86-21-68895196
Fax:	/

3.2. Manufacturer information

Name of Company:	ZTE Corporation
Address /Post:	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China
City:	Shenzhen
Postal Code:	518057
Country:	China
Telephone:	+86-21-68895196
Fax:	/

4. EQUIPMENT UNDER TEST(EUT) AND ANCILLARY EQUIPMENT(AE)

4.1. About EUT

Product name:	HSPA USB ADAPTER
Model:	MF10
FCC ID:	Q78-ZTEMF10
With WLAN Function:	Yes
EUT operating voltage- Normal:	5V
Extreme Low Voltage:	/
Extreme High Voltage:	/
Extreme temperature:	-20°C / + 55°C

Note: please refer to ANNEX A in this test report for Photographs of EUT.

4.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	/	B02	CR_P670A2V0.0.0B02
EUT2	/	B02	CR_P670A2V0.0.0B02

*EUT ID is used to identify the test sample in the lab internally.

4.3. Internal Identification of AE used during the test

AE ID*	Description	Type	SN
AE1	Switching Adapter	DSA-12PFA-05 FUS 050200	/

*AE ID: is used to identify the test sample in the lab internally.

5. REFERENCE DOCUMENTS

5.1. Documents supplied by applicant

EUT feature information is supplied by the client or manufacturer, which is the basis of testing.

5.2. Reference Documents

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902 - 928MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz.	July 10, 2008 Edition
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2003
KDB558074	Measurement of Digital Transmission Systems Operating under Section 15.247	March 23, 2005

6. TEST RESULTS

6.1. Summary of Test Results

Abbreviations used in this clause:

P Pass

F Fail

NA not applicable

NM not measured

SUMMARY OF MEASUREMENT RESULTS	Sub-clause	Verdict
Maximum Peak Output Power	15.247 (a)	P
Peak Power Spectral Density	15.247 (d)	P
Occupied 6dB Bandwidth	15.247(d)	P
Band Edges Compliance	15.247 (b)	P
Transmitter Spurious Emission-Conducted	15.247	P
Transmitter Spurious Emission-Radiated	15.247, 15.209, 15.209	P
AC Powerline Conducted Emission	15.107, 15.207	P

Please refer to **ANNEX A** for detail.

The measurement is made according to ANSI C63.4 and KDB558074

6.2. Statements

TMC has evaluated the test cases requested by the client/manufacturer as listed in section 6.1 of this report for the EUT specified in section 4 according to the standards or reference documents listed in section 5.2.

7. TEST EQUIPMENTS

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Vector Signal Analyzer	FSQ26	200136	Rohde & Schwarz	2010-01-15
2	Power Meter	NRVD	101078	Rohde & Schwarz	2010-09-02
3	DIODE Power Sensor	NRV-Z15	100103	Rohde & Schwarz	2010-09-02
4	Test Receiver	ESS	847151/015	Rohde & Schwarz	2009-10-30
5	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2010-08-13

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Test Receiver	ESI40	831564/002	Rohde & Schwarz	2010-02-12
2	BiLog Antenna	3142B	9908-1403	EMCO	2010-03-15
3	Dual-Ridge Waveguide Horn Antenna	3115	9906-5827	EMCO	2009-12-25

Anechoic chamber

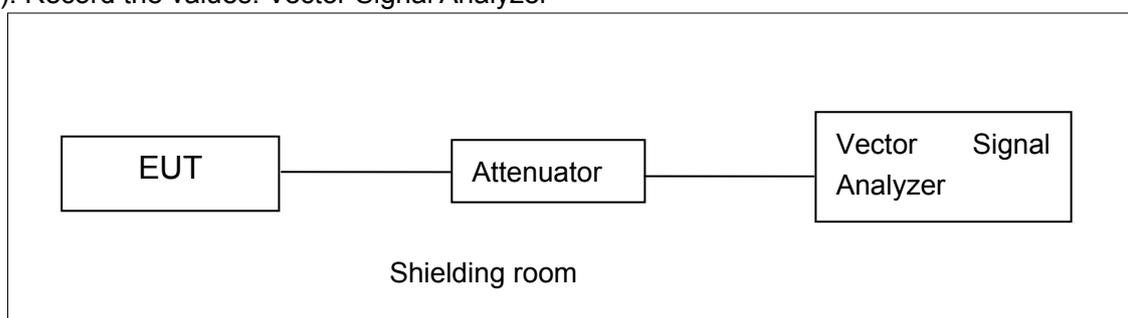
Fully anechoic chamber by Frankonia German.

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

A.1.1. Conducted Measurements

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).
- 3). Set the EUT to the required channel.
- 4). Set the EUT hopping mode (hopping or hopping off).
- 5). Set the spectrum analyzer to start measurement.
- 6). Record the values. Vector Signal Analyzer

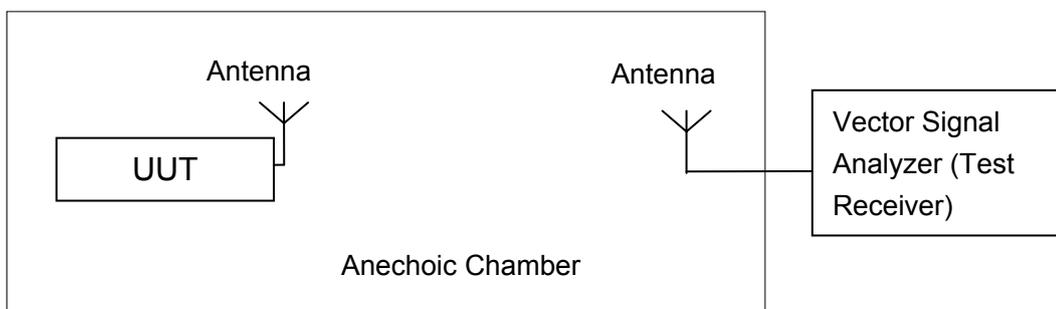


A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;



The measurement is made according to ANSI C63.4 and KDB558074

A.2. Maximum Peak Output Power

Measurement Limit and Method:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

The measurement is made according to ANSI C63.4 and KDB558074

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
-------------------------	--------

Measurement Results:

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	15.33	16.46	15.03
	2	15.50	16.56	15.28
	5.5	15.52	16.59	15.27
	11	15.69	16.64	15.29
802.11g	6	18.26	19.64	18.05
	9	18.02	19.12	17.90
	12	18.46	19.62	18.37
	18	18.35	19.50	17.43
	24	18.50	19.72	18.13
	36	18.13	19.53	17.97
	48	18.26	19.84	18.06
	54	18.52	19.96	18.38

The data rate 11Mbps and 6Mbps are selected as worse condition, and the following cases are performed with this condition.

Conclusion: PASS

A.3. Peak Power Spectral Density

Measurement Limit:

Standard	Limit
FCC CRF Part 15.247(d)	< 8 dBm/3 kHz

The measurement is made according to ANSI C63.4 and KDB558074

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
-------------------------	--------

Measurement Results:

Mode	Channel	Power Spectral Density (dBm/3 kHz)	Conclusion
802.11b	1	-13.23	P
	6	-12.44	P
	11	-12.25	P
802.11g	1	-19.72	P
	6	-18.20	P
	11	-19.37	P

Conclusion: PASS

A.4. Occupied 6dB Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

The measurement is made according to ANSI C63.4 and KDB558074

Measurement Uncertainty:

Measurement Uncertainty	60.80Hz
-------------------------	---------

Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth (kHz)		conclusion
		Fig.	Value	
802.11b	1	Fig.1	11314	P
	6	Fig.2	10336	P
	11	Fig.3	11346	P
802.11g	1	Fig.4	16442	P
	6	Fig.5	16442	P
	11	Fig.6	16394	P

See annex B for test graphs.

Conclusion: PASS

A.5. Band Edges Compliance

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

The measurement is made according to ANSI C63.4 and KDB558074

Measurement Uncertainty:

Measurement Uncertainty	0.75dB
-------------------------	--------

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11b	1	Fig.7	P
	11	Fig.8	P
802.11g	1	Fig.9	P
	11	Fig.10	P

See annex B for test graphs.

Conclusion: PASS

A.6. Transmitter Spurious Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

The measurement is made according to ANSI C63.4 and KDB558074

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)).

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Measurement Uncertainty:

Frequency Range	Uncertainty
$30\text{MHz} \leq f \leq 2\text{GHz}$	0.63
$2\text{GHz} \leq f \leq 3.6\text{GHz}$	0.82
$3.6\text{GHz} \leq f \leq 8\text{GHz}$	1.55
$8\text{GHz} \leq f \leq 20\text{GHz}$	1.86
$20\text{GHz} \leq f \leq 22\text{GHz}$	1.90
$22\text{GHz} \leq f \leq 26\text{GHz}$	2.20

A.6.1 Transmitter Spurious Emission-Conducted

Measurement Results:

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412 GHz	Fig.11	P
		30 MHz ~ 1 GHz	Fig.12	P
		1 GHz ~ 26 GHz	Fig.13	P
	6	2.437 GHz	Fig.14	P
		30 MHz ~ 1 GHz	Fig.15	P
		1 GHz ~ 26 GHz	Fig.16	P
	11	2.472 GHz	Fig.17	P
		30 MHz ~ 1 GHz	Fig.18	P
		1 GHz ~ 26 GHz	Fig.19	P

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802.11g	1	2.412 GHz	Fig.20	P
		30 MHz ~ 1 GHz	Fig.21	P
		1 GHz ~ 26 GHz	Fig.22	P
	6	2.437 GHz	Fig.23	P
		30 MHz ~ 1 GHz	Fig.24	P
		1 GHz ~ 26 GHz	Fig.25	P
	11	2.472 GHz	Fig.26	P
		30 MHz ~ 1 GHz	Fig.27	P
		1 GHz ~ 26 GHz	Fig.28	P

See annex B for test graphs.

Conclusion: PASS

A.6.1 Transmitter Spurious Emission-Radiated

Limit in restricted band:

Measurement Results:

Mode	Channel	Frequency Range	Test Results	Conclusion	
802.11b	Power	2.45GHz ~2.5GHz	Fig.29	P	
	1	30 MHz ~1 GHz	Fig.30	P	
		1 GHz ~ 4 GHz	Fig.31	P	
		4 GHz ~ 18 GHz	Fig.32	P	
	6	30 MHz ~1 GHz	Fig.33	P	
		1 GHz ~ 4 GHz	Fig.34	P	
		4 GHz ~ 18 GHz	Fig.35	P	
	11	30 MHz ~1 GHz	Fig.36	P	
		1 GHz ~ 4 GHz	Fig.37	P	
		4 GHz ~ 18 GHz	Fig.38	P	
	802.11g	Power	2.4GHz~2.5GHz	Fig.39	P
		1	30 MHz ~1 GHz	Fig.40	P
1 GHz ~ 4 GHz			Fig.41	P	
4 GHz ~ 18 GHz			Fig.42	P	
6		30 MHz ~1 GHz	Fig.43	P	
		1 GHz ~ 4 GHz	Fig.44	P	
		4 GHz ~ 18 GHz	Fig.45	P	
11		30 MHz ~1 GHz	Fig.46	P	
		1 GHz ~ 4 GHz	Fig.47	P	
		4 GHz ~ 18 GHz	Fig.48	P	
/		All channels	18 GHz~ 26 GHz	Fig.49	P

See annex B for test graphs.

Conclusion: PASS

A.7. AC Powerline Conducted Emission

Test Condition

Voltage (V)	Frequency (Hz)
110	60

Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		802.11b Mode	802.11g Mode	
0.15 to 0.5	66 to 56	Fig. 50	Fig. 51	P
0.5 to 5	56			
5 to 30	60			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dB μ V)	Result (dB μ V)		Conclusion
		With charger		
		802.11b Mode	802.11g Mode	
0.15 to 0.5	56 to 46	Fig. 50	Fig. 51	P
0.5 to 5	46			
5 to 30	50			

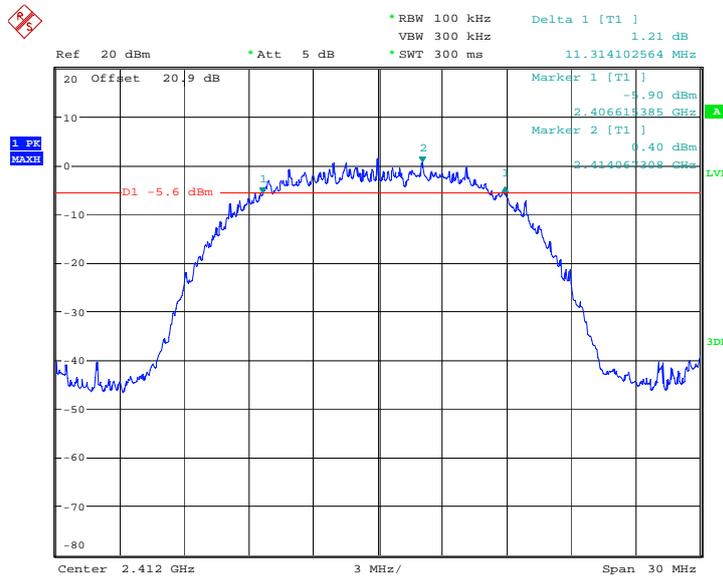
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.4 and KDB558074

See annex B for test graphs.

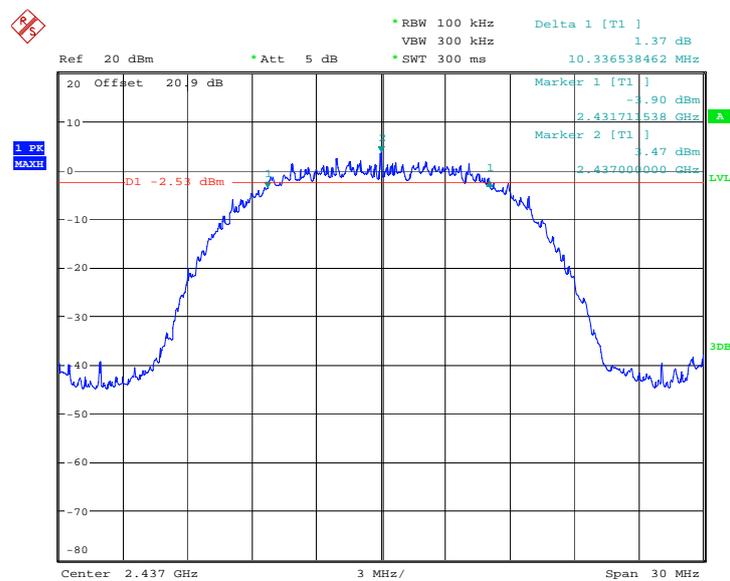
Conclusion: PASS

ANNEX B: TEST FIGURE LIST



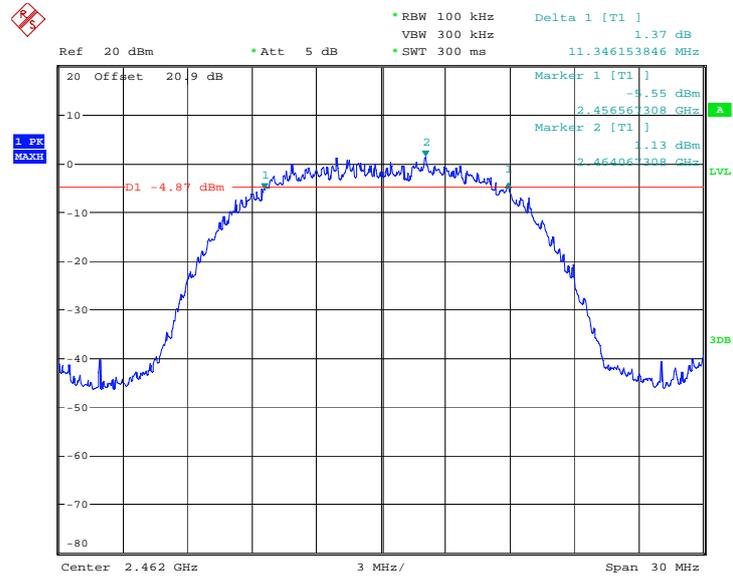
Date: 11.AUG.2009 15:09:30

Fig. 1 Occupied 6dB Bandwidth (802.11b, Ch 1)



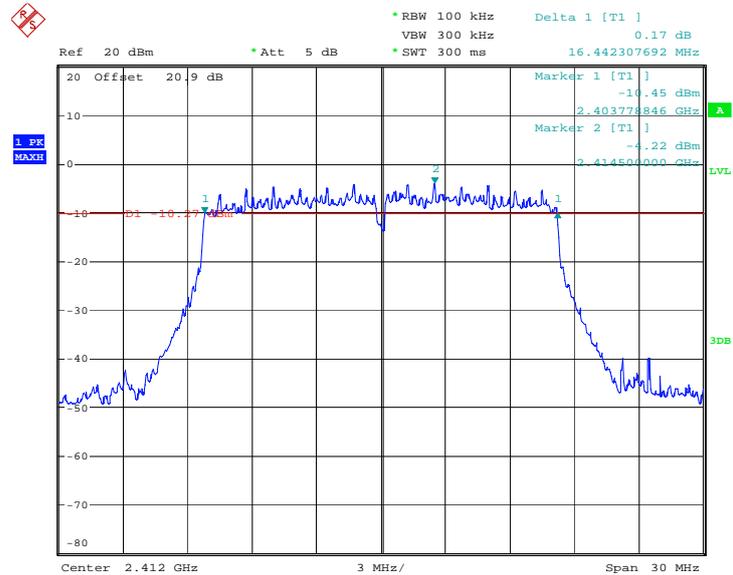
Date: 11.AUG.2009 15:11:23

Fig. 2 Occupied 6dB Bandwidth (802.11b, Ch 6)



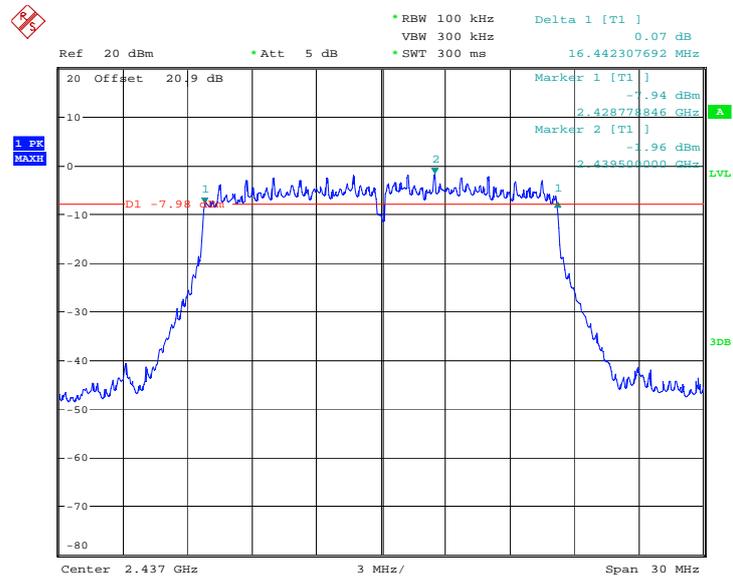
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Fig. 3 Occupied 6dB Bandwidth (802.11b, Ch 11)



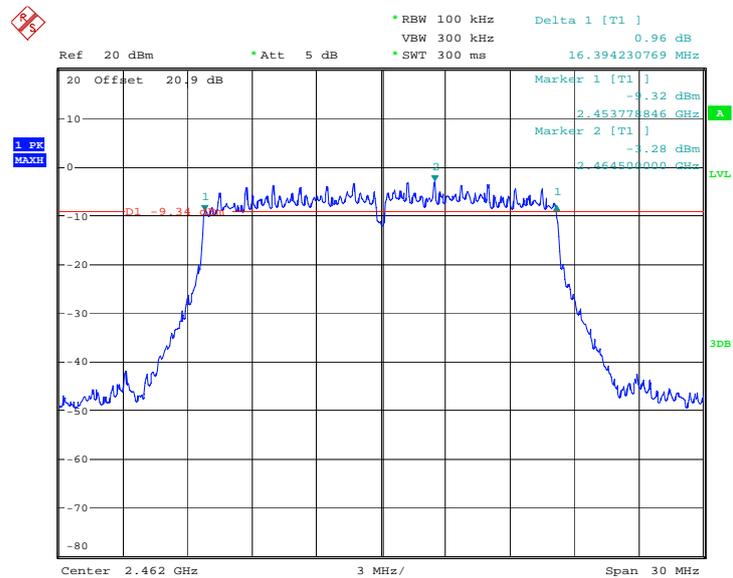
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Fig. 4 Occupied 6dB Bandwidth (802.11g, Ch 1)



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Fig. 5 Occupied 6dB Bandwidth (802.11g, Ch 6)



Date: 11.AUG.2009 15:17:29

Fig. 6 Occupied 6dB Bandwidth (802.11g, Ch 11)

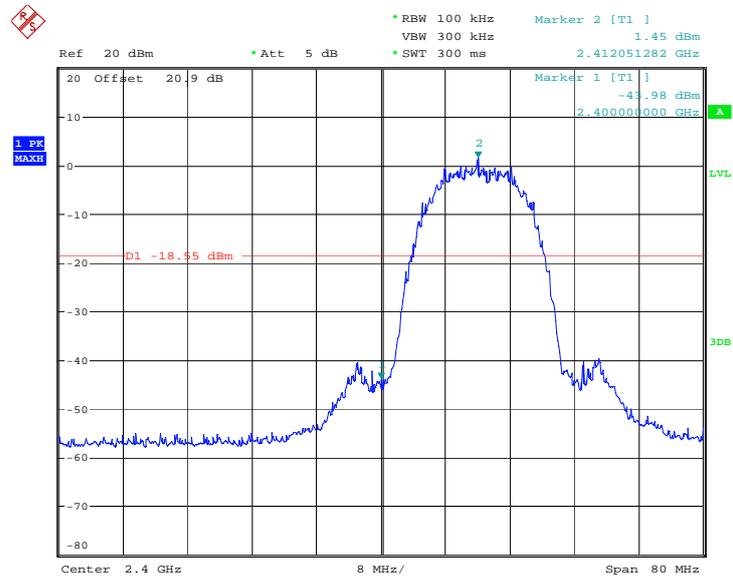


Fig. 7 Band Edges (802.11b, Ch 1)

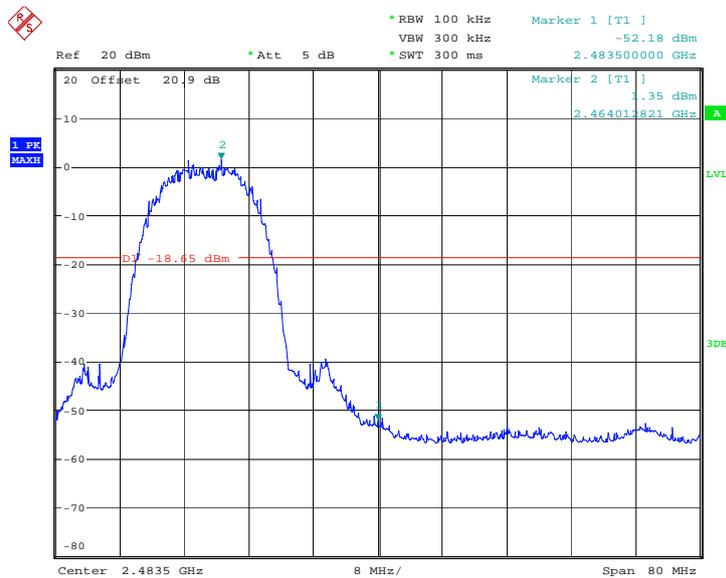
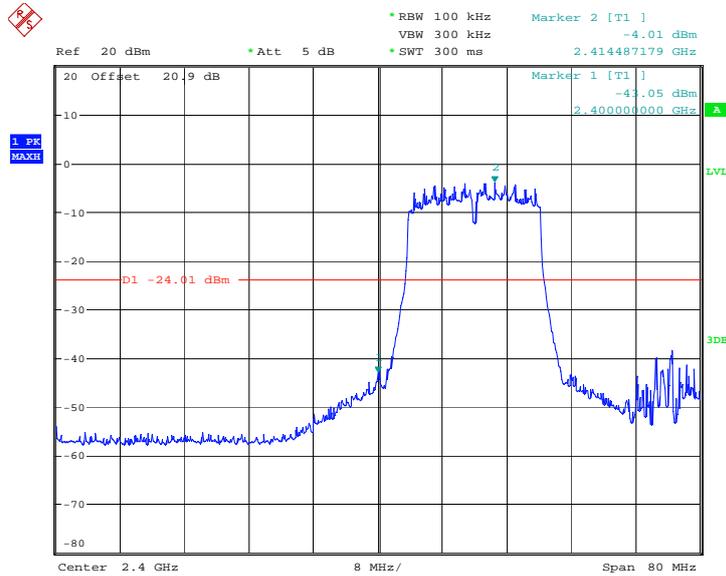
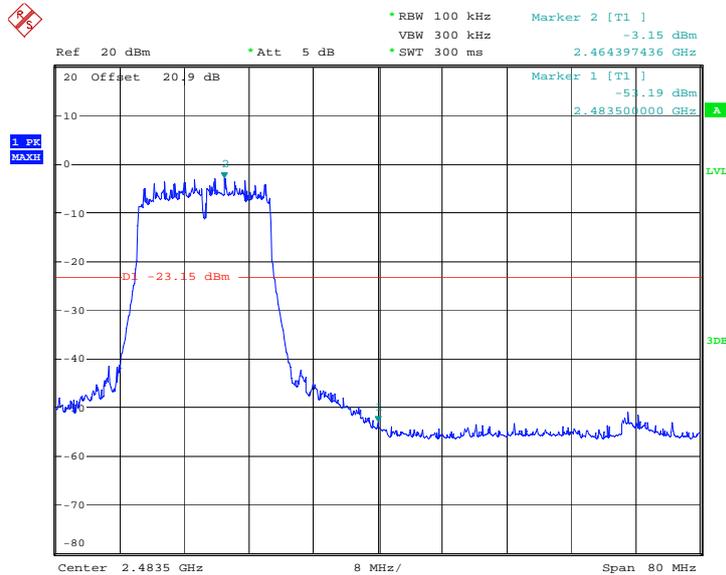


Fig. 8 Band Edges (802.11b, Ch 11)



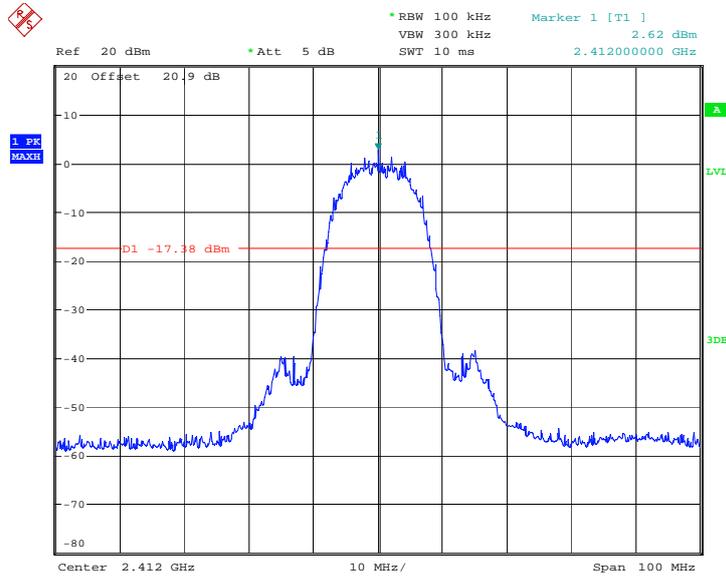
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Fig. 9 Band Edges (802.11g, Ch 1)



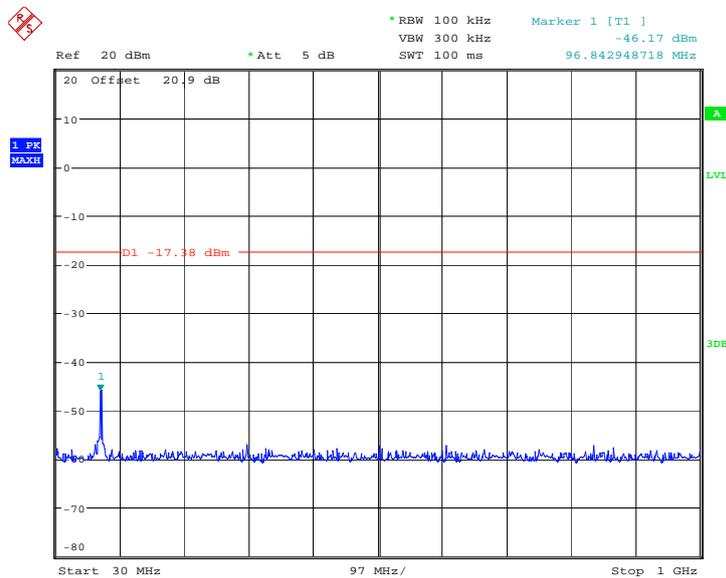
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Fig. 10 Band Edges (802.11g, Ch 11)



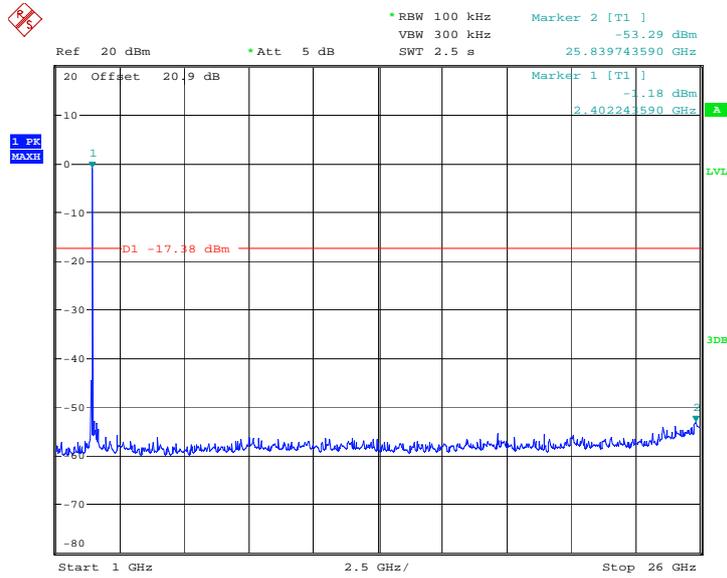
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Fig. 11 Conducted Spurious Emission (802.11b, Ch1, Center Frequency)



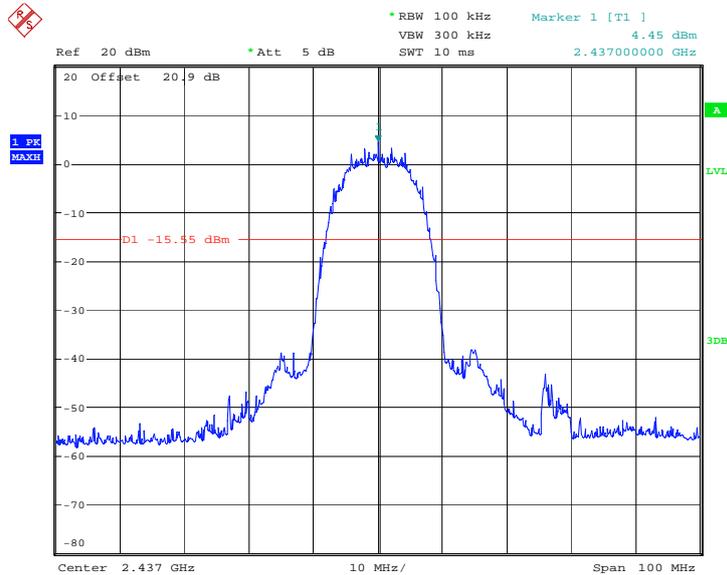
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Fig. 12 Conducted Spurious Emission (802.11b, Ch1, 30 MHz-1 GHz)



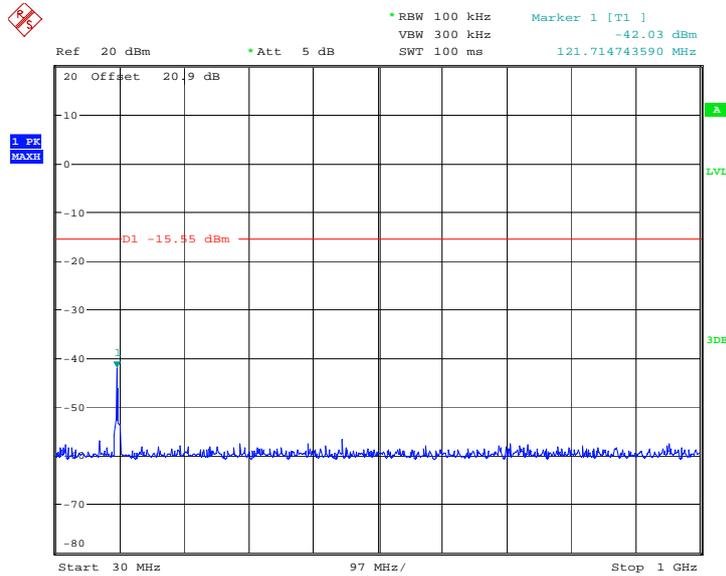
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Fig. 13 Conducted Spurious Emission (802.11b, Ch1, 1 GHz-26 GHz)



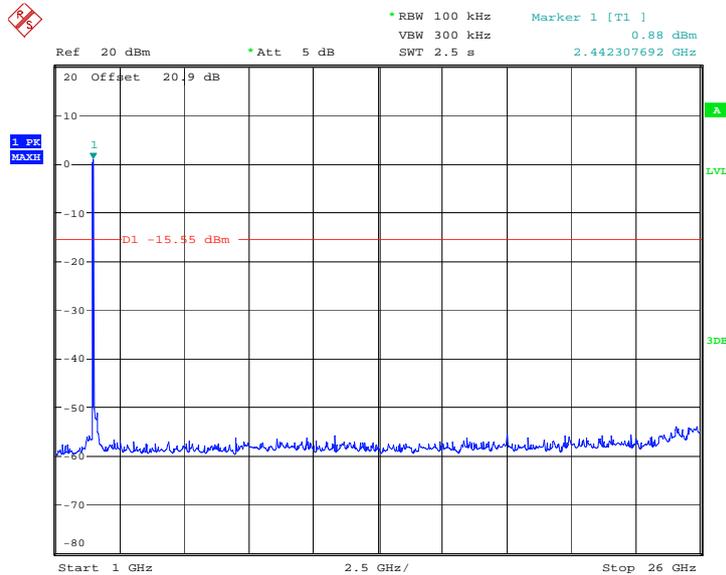
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Fig. 14 Conducted Spurious Emission (802.11b, Ch6, Center Frequency)



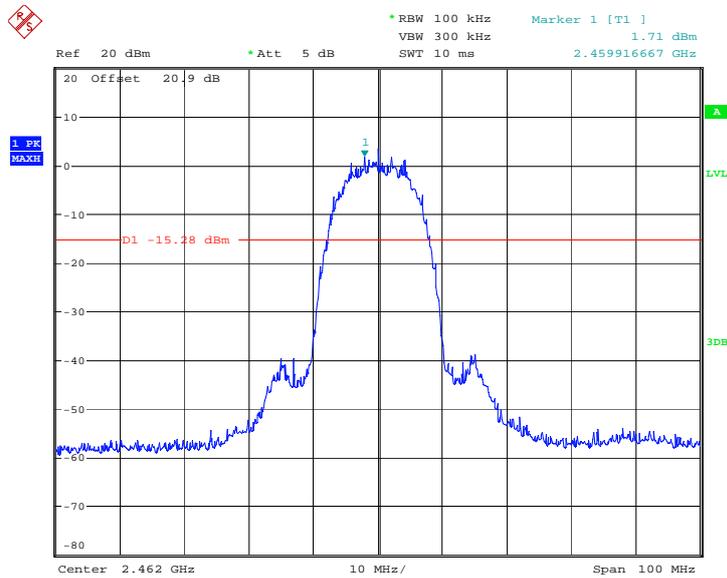
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Fig. 15 Conducted Spurious Emission (802.11b, Ch6, 30 MHz-1 GHz)



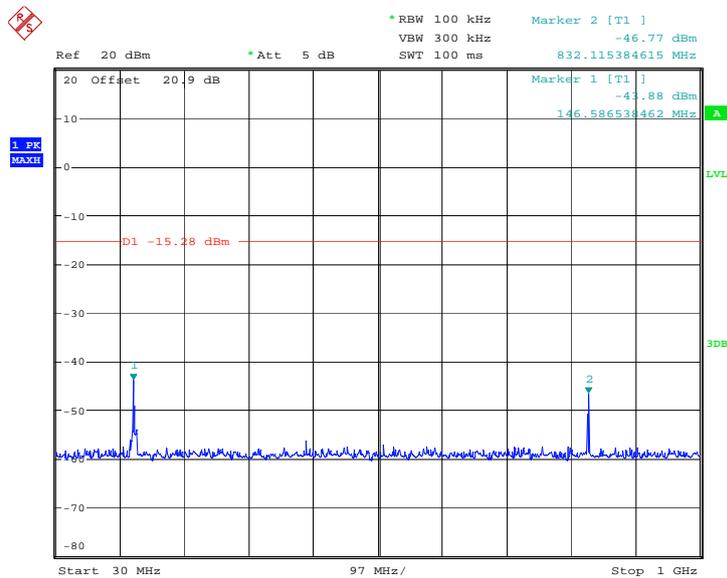
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Fig. 16 Conducted Spurious Emission (802.11b, Ch6, 1 GHz-26 GHz)



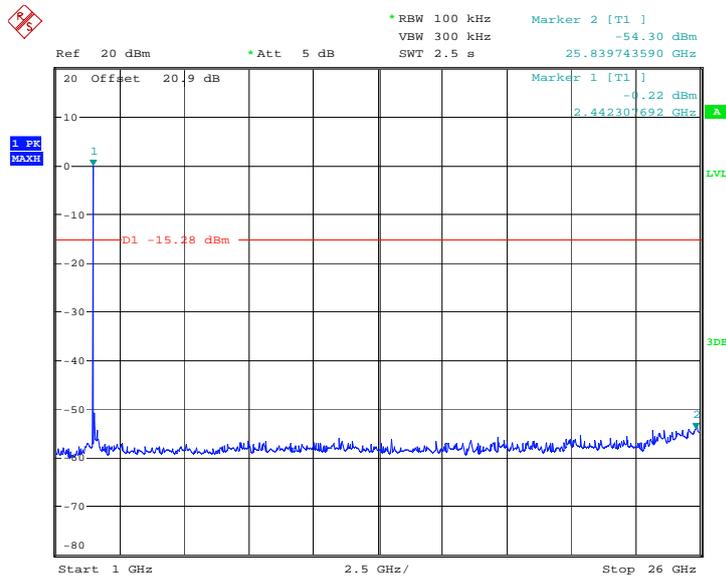
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Fig. 17 Conducted Spurious Emission (802.11b, Ch11, Center Frequency)



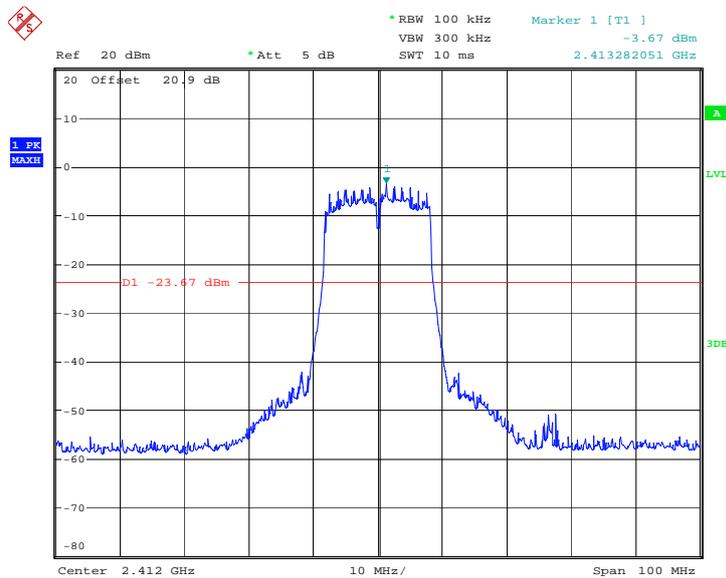
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Fig. 18 Conducted Spurious Emission (802.11b, Ch11, 30 MHz-1 GHz)



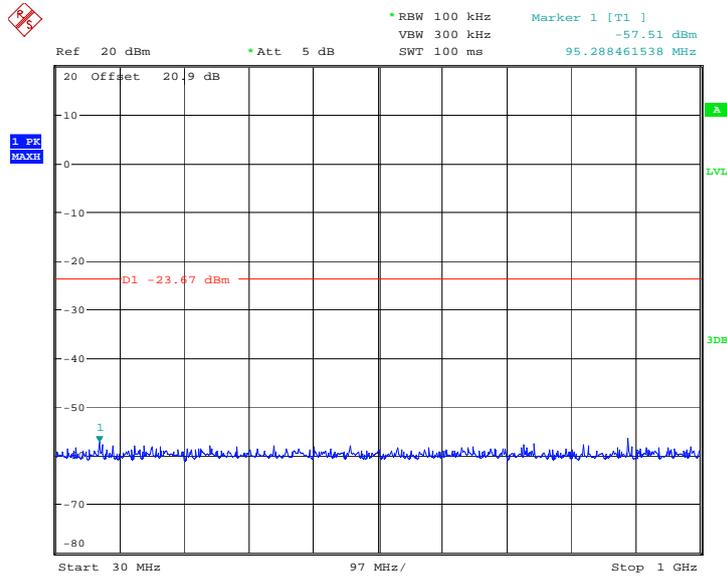
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Fig. 19 Conducted Spurious Emission (802.11b, Ch11, 1 GHz-26 GHz)



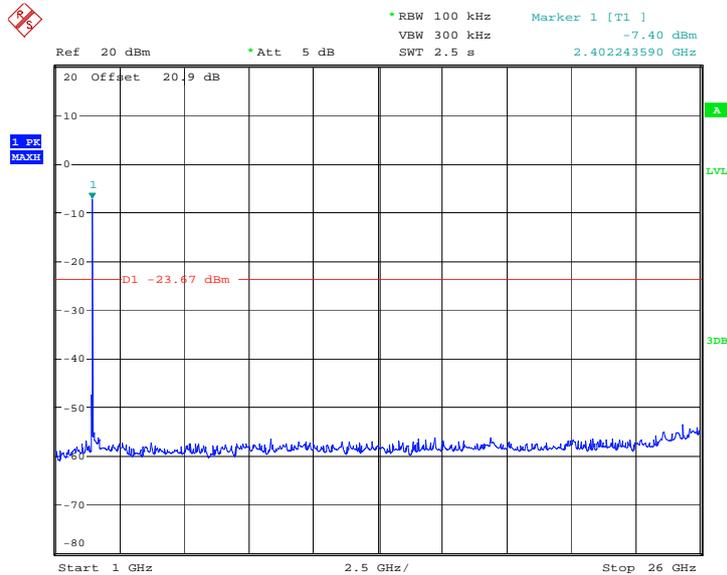
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Fig. 20 Conducted Spurious Emission (802.11g, Ch1, Center Frequency)



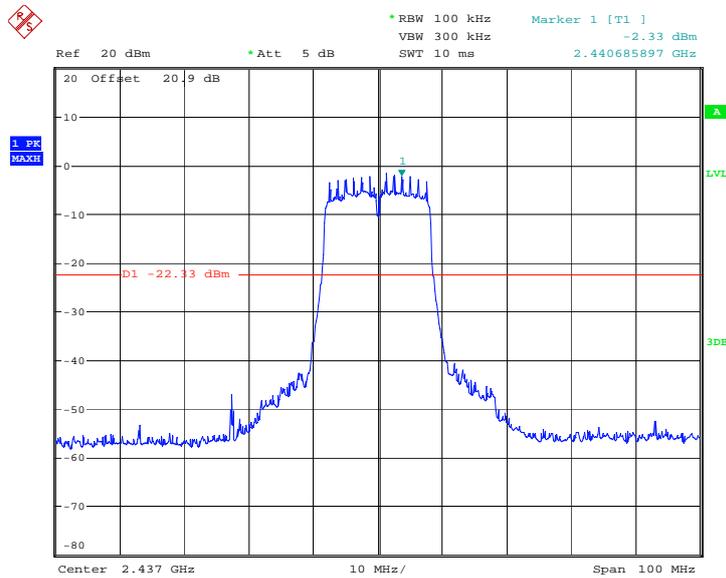
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Fig. 21 Conducted Spurious Emission (802.11g, Ch1, 30 MHz-1 GHz)



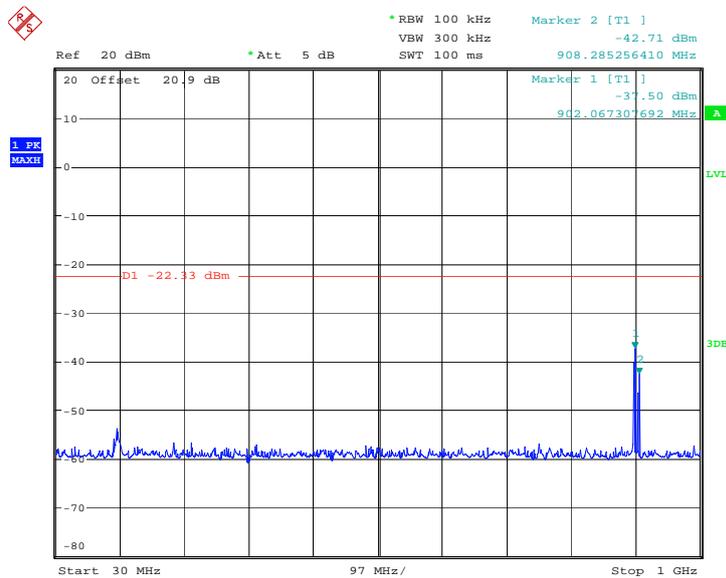
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Fig. 22 Conducted Spurious Emission (802.11g, Ch1, 1 GHz-26 GHz)



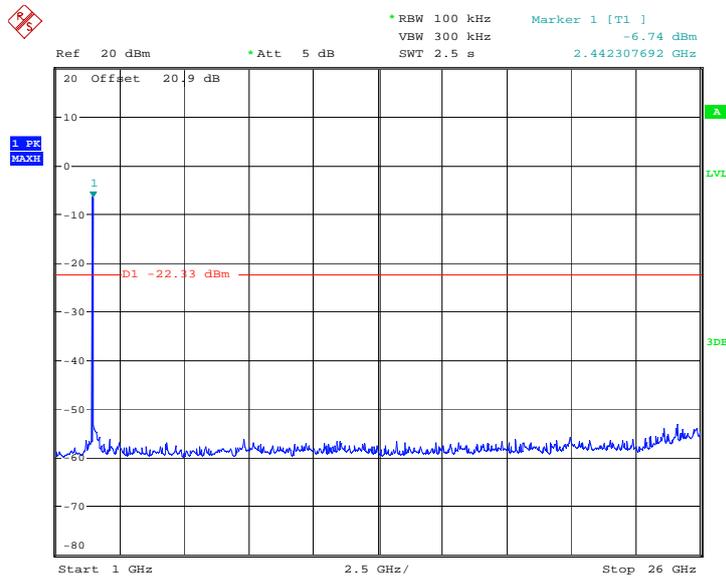
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Fig. 23 Conducted Spurious Emission (802.11g, Ch6, Center Frequency)



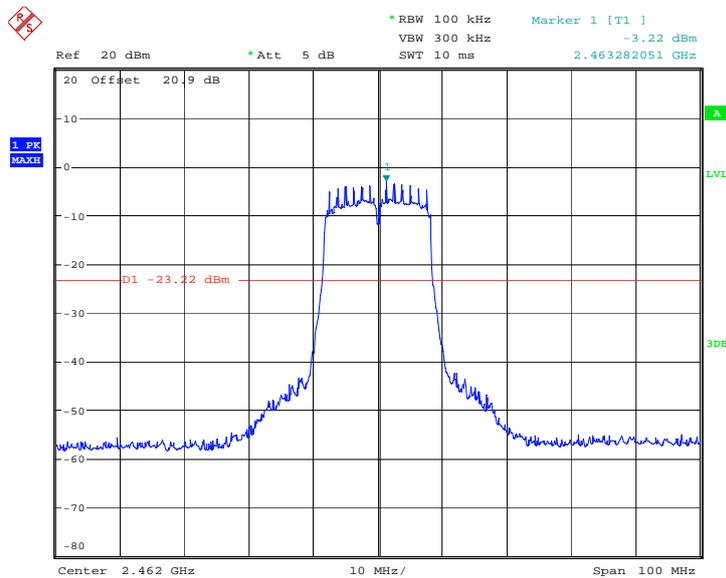
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Fig. 24 Conducted Spurious Emission (802.11g, Ch6, 30 MHz-1 GHz)



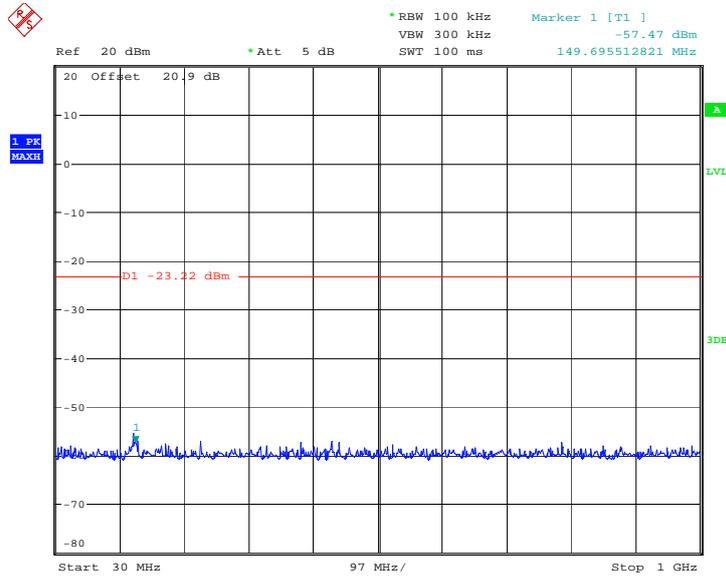
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Fig. 25 Conducted Spurious Emission (802.11g, Ch6, 1 GHz-26 GHz)



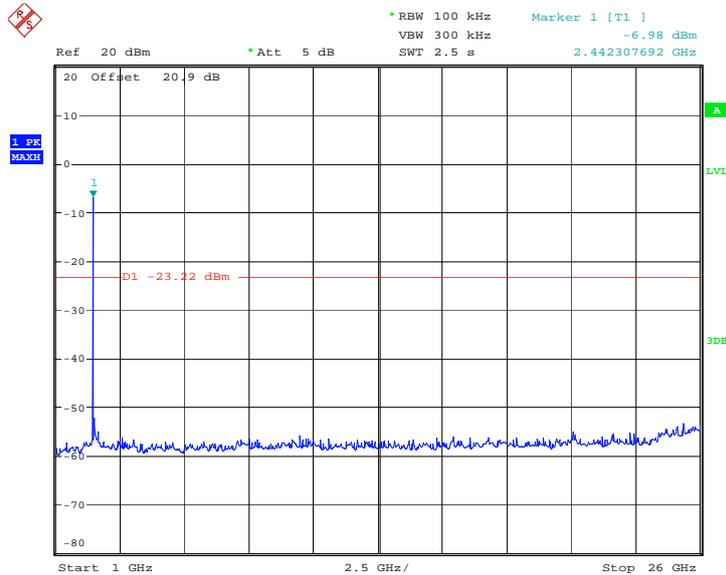
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Fig. 26 Conducted Spurious Emission (802.11g, Ch11, Center Frequency)



Date: 28.AUG.2009 09:40:14

Fig. 27 Conducted Spurious Emission (802.11g, Ch11, 30 MHz-1 GHz)



Date: 28.AUG.2009 09:40:51

Fig. 28 Conducted Spurious Emission (802.11g, Ch11, 1 GHz-26 GHz)

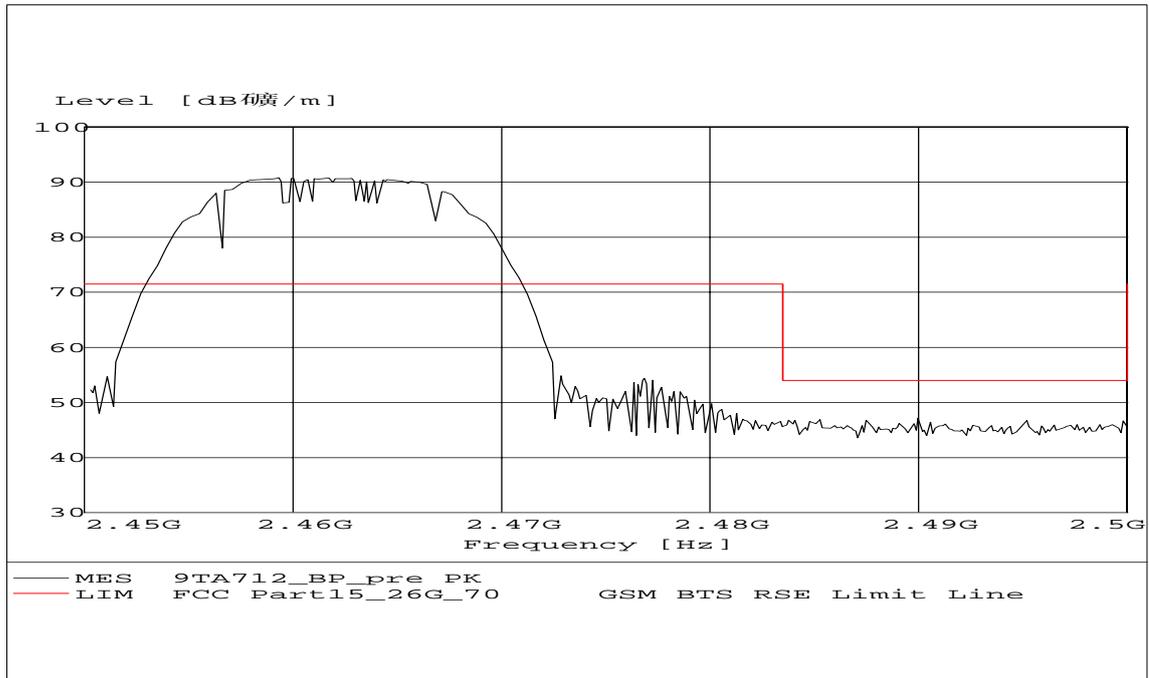


Fig. 29 Radiated Spurious Emission (Power): 802.11b, 2.45 GHz - 2.5GHz

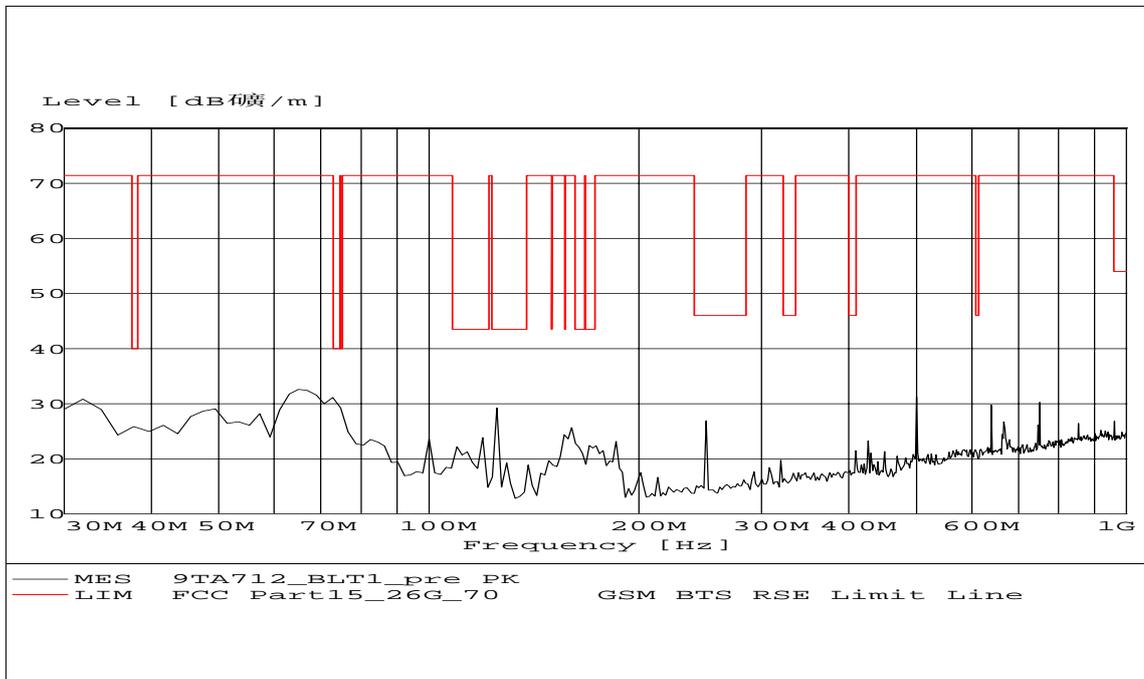


Fig. 30 Radiated Spurious Emission (802.11b, Ch1, 30 MHz-1 GHz)

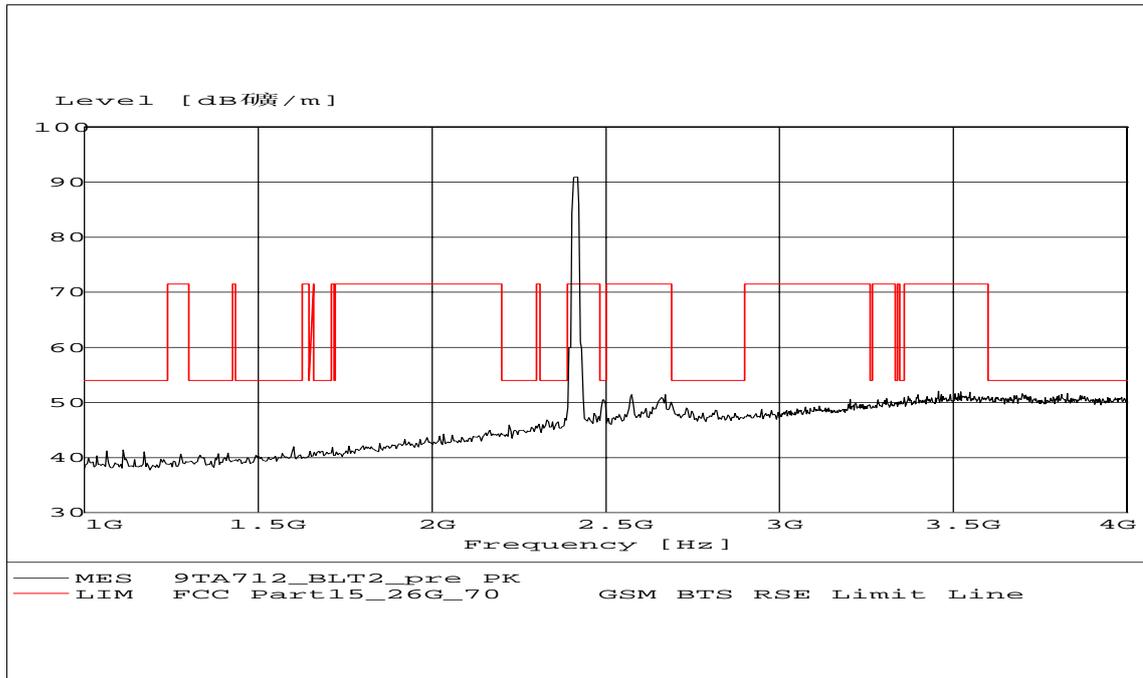


Fig. 31 Radiated Spurious Emission (802.11b, Ch1, 1 GHz-4 GHz)

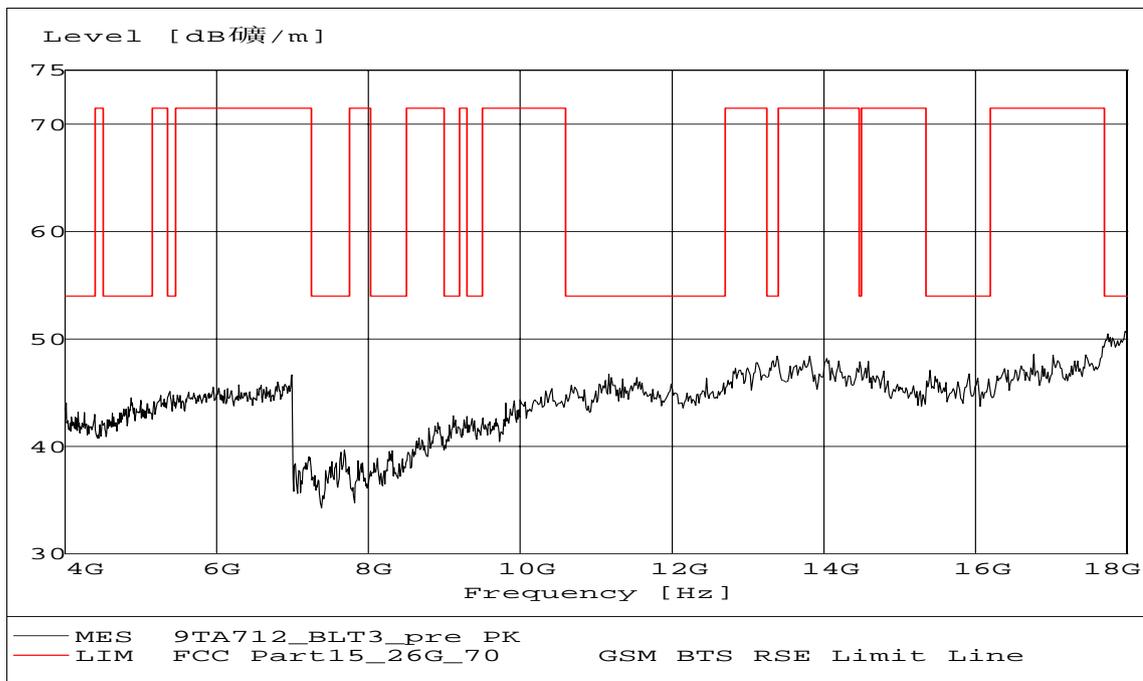


Fig. 32 Radiated Spurious Emission (802.11b, Ch1, 4 GHz-18 GHz)

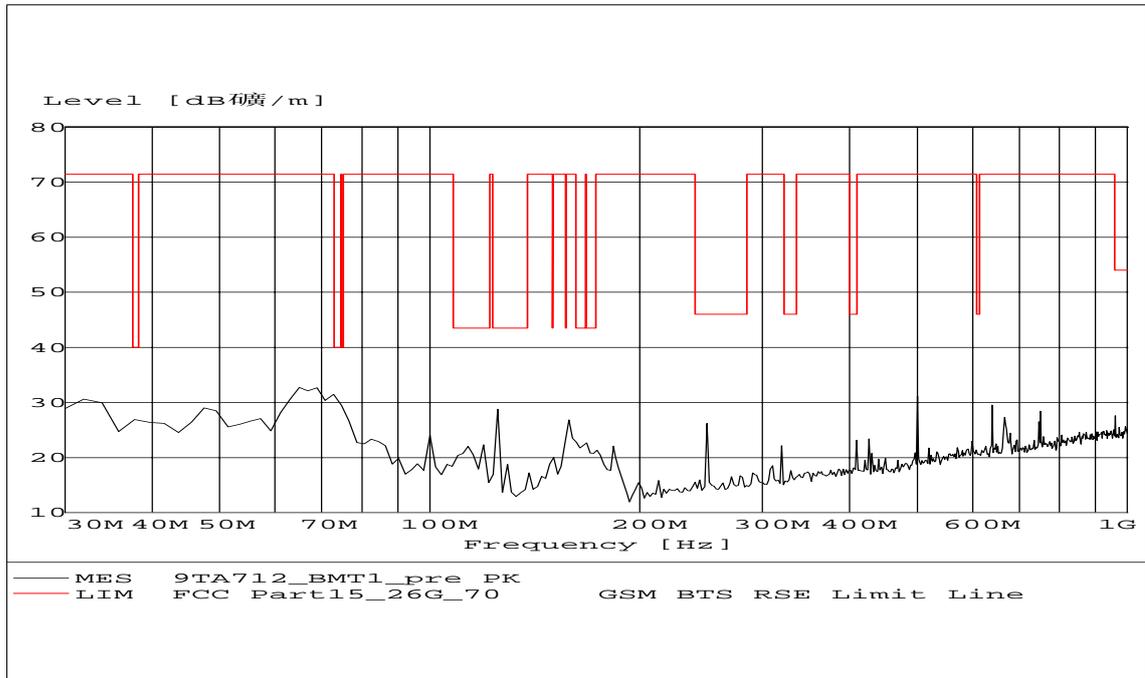


Fig. 33 Radiated Spurious Emission (802.11b, Ch6, 30 MHz-1 GHz)

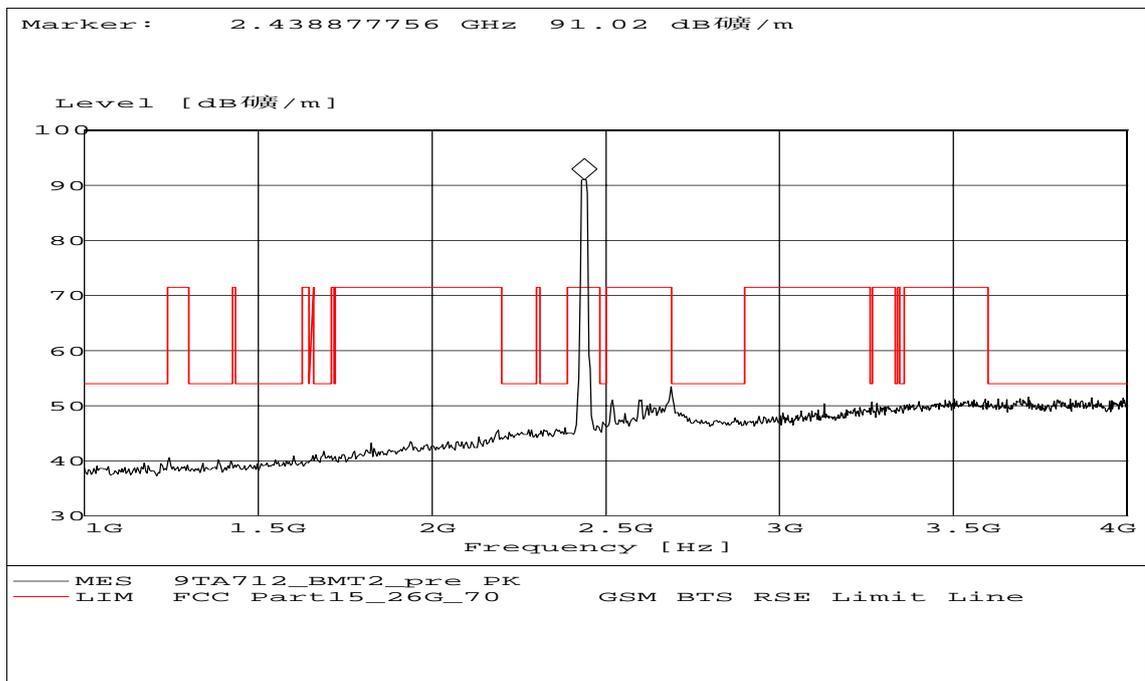


Fig. 34 Radiated Spurious Emission (802.11b, Ch6, 1 GHz-4 GHz)

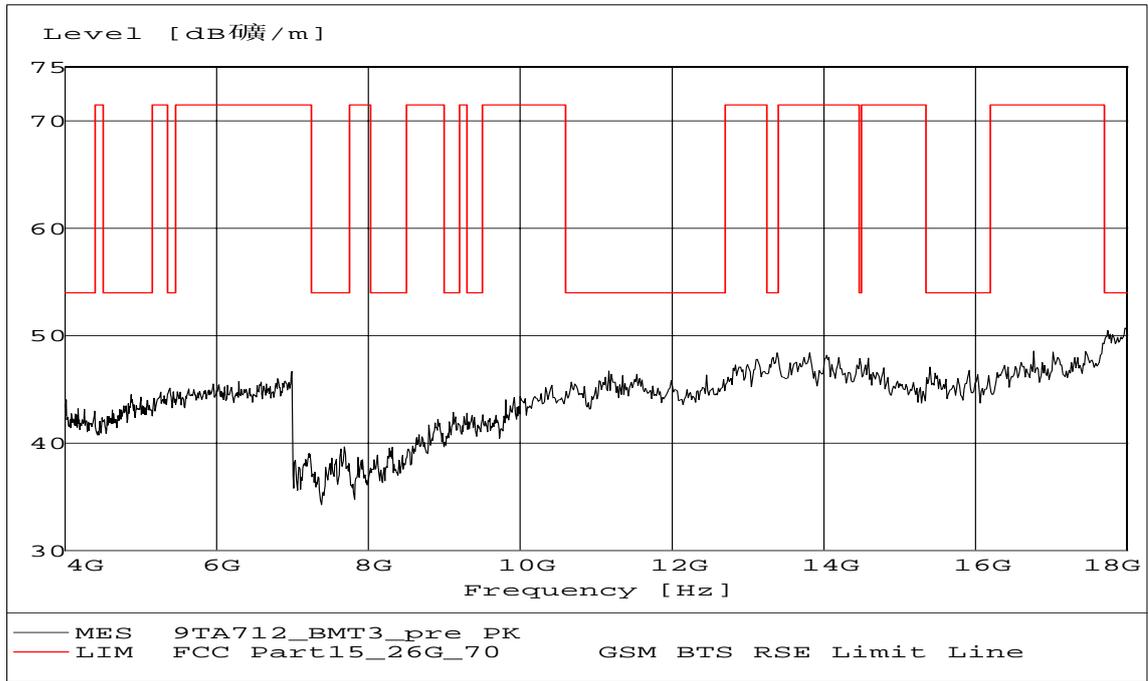


Fig. 35 Radiated Spurious Emission (802.11b, Ch6, 4 GHz-18 GHz)

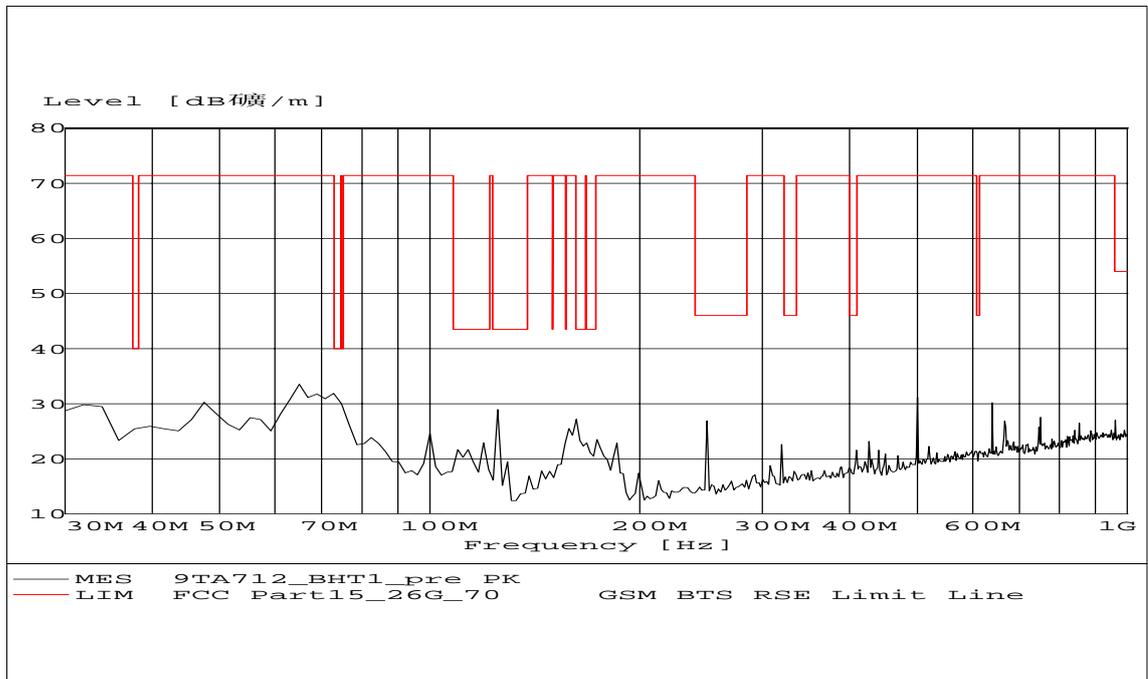


Fig. 36 Radiated Spurious Emission (802.11b, Ch11, 30 MHz-1 GHz)

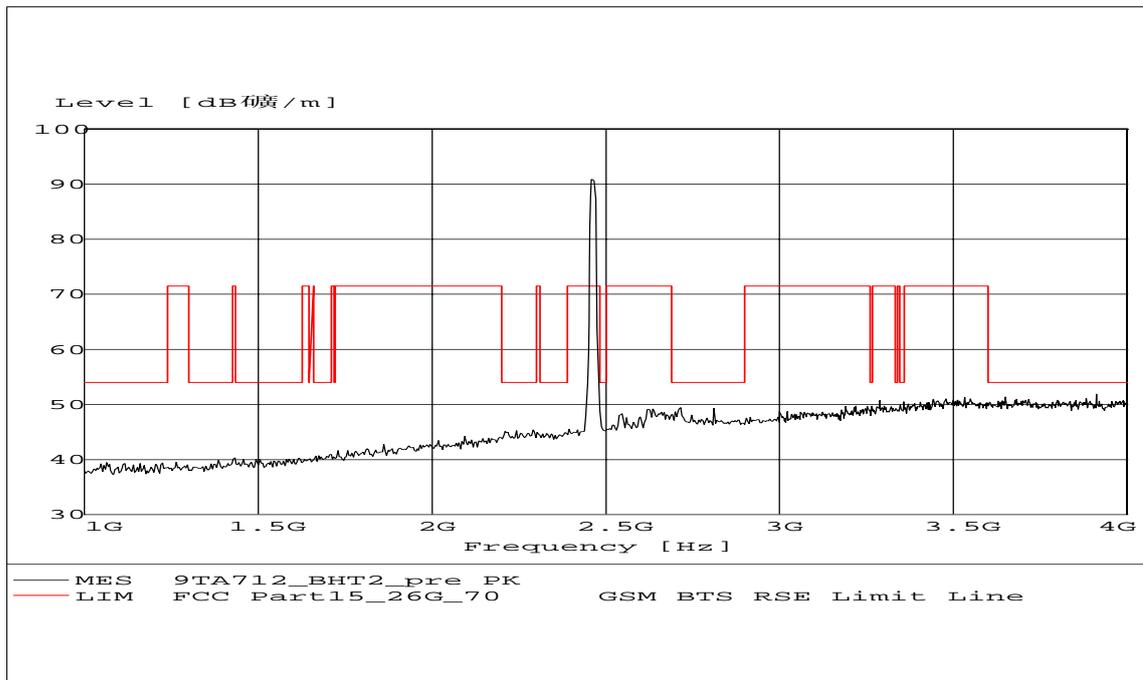


Fig. 37 Radiated Spurious Emission (802.11b, Ch11, 1 GHz-4 GHz)

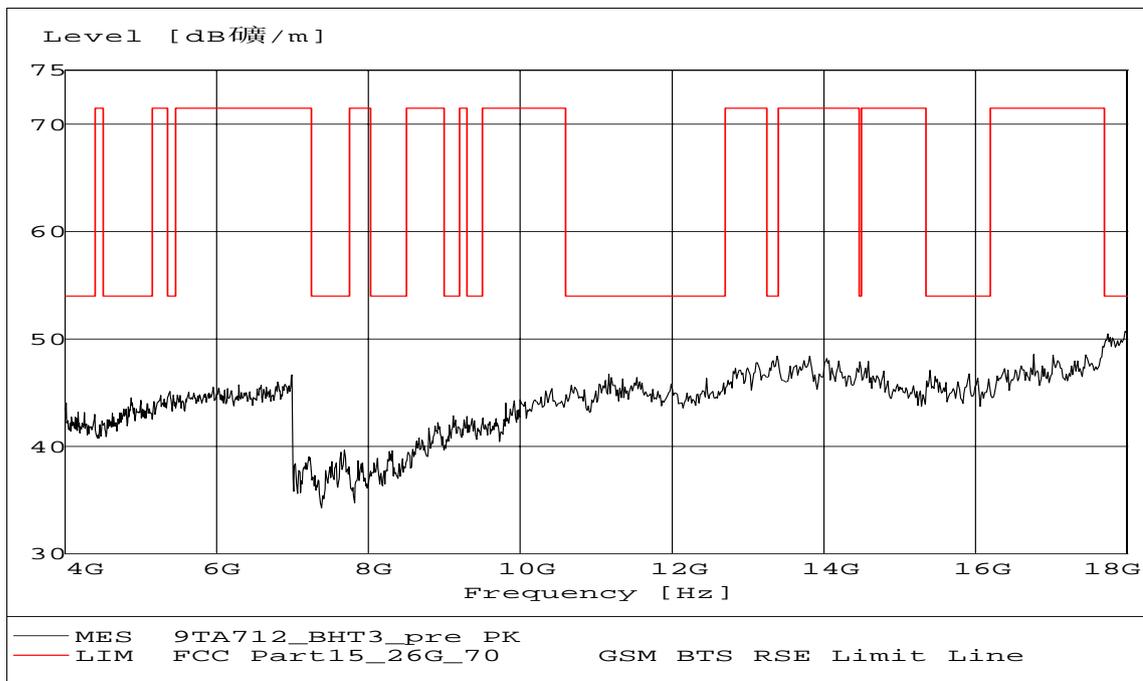


Fig. 38 Radiated Spurious Emission (802.11b, Ch11, 4 GHz-18 GHz)

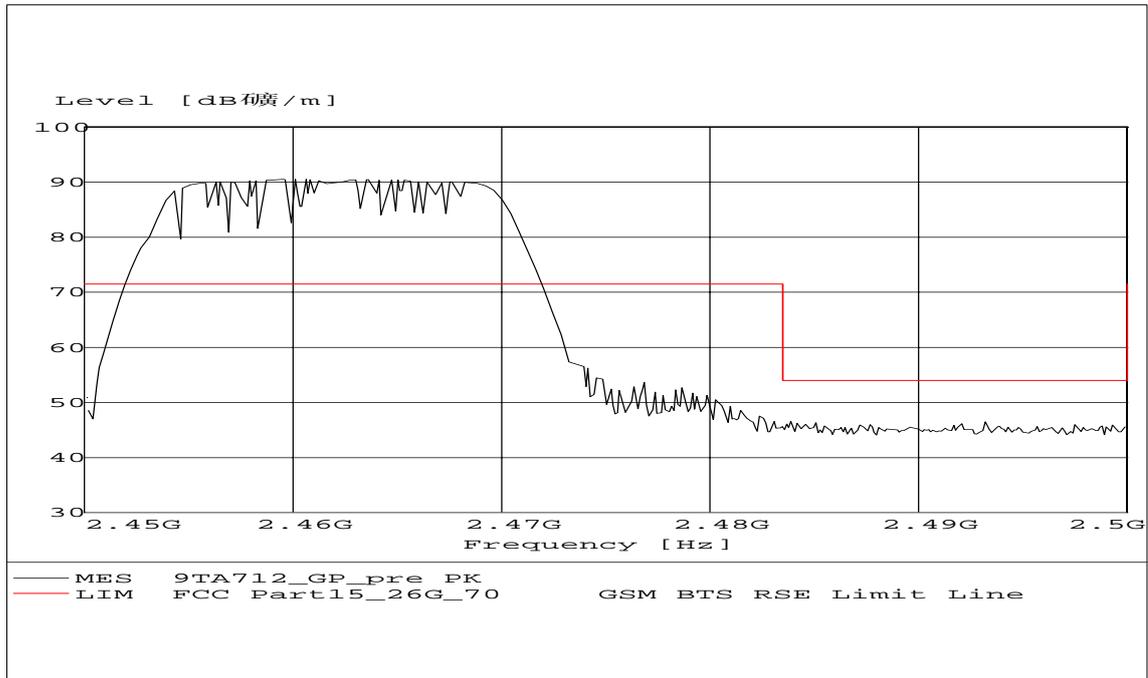


Fig. 39 Radiated Spurious Emission (Power): 802.11g, 2.45 GHz - 2.5GHz

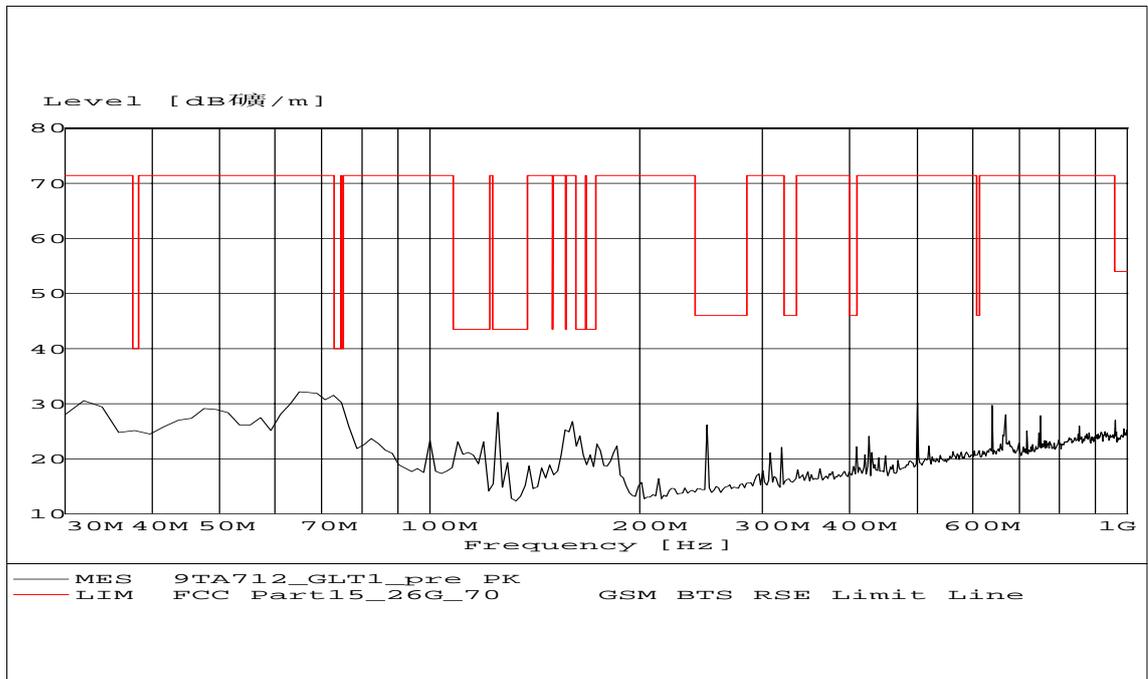


Fig. 40 Radiated Spurious Emission (802.11g, Ch1, 30 MHz-1 GHz)

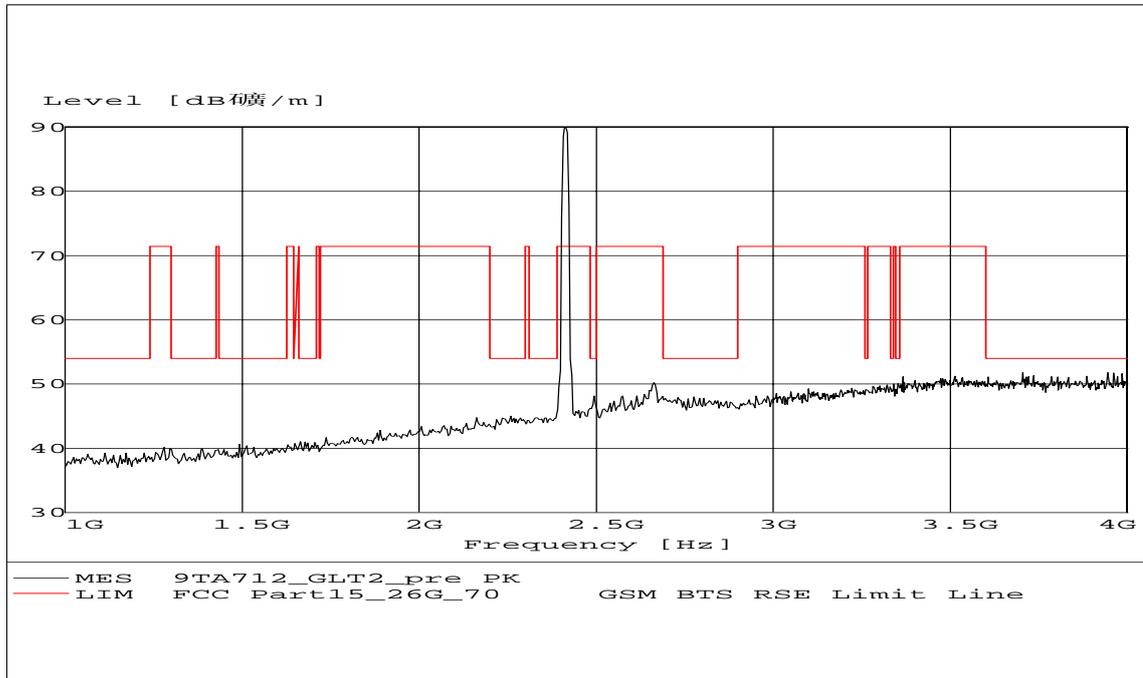


Fig. 41 Radiated Spurious Emission (802.11g, Ch1, 1 GHz-4 GHz)

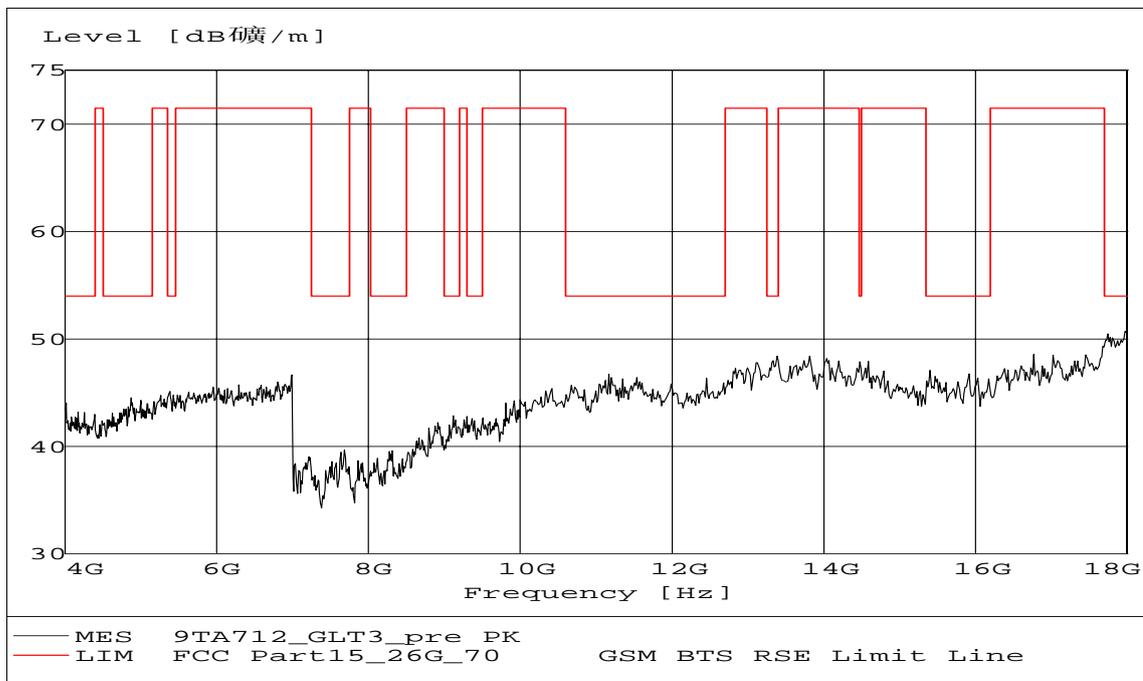


Fig. 42 Radiated Spurious Emission (802.11g, Ch1, 4 GHz-18 GHz)

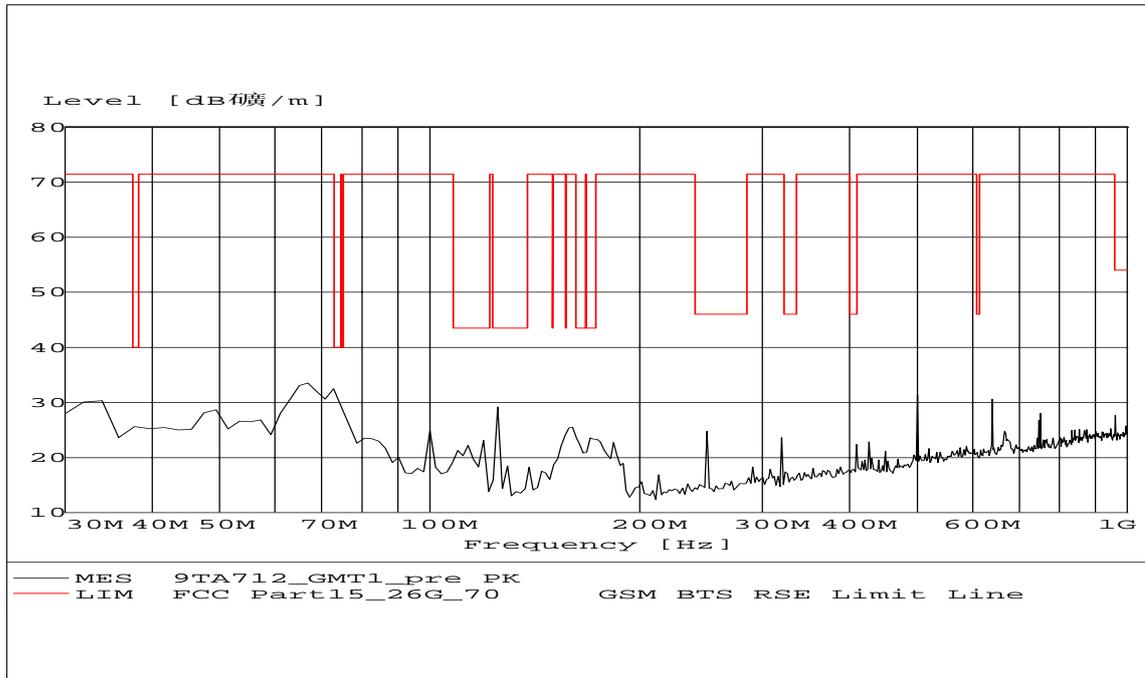


Fig. 43 Radiated Spurious Emission (802.11g, Ch6, 30 MHz-1 GHz)

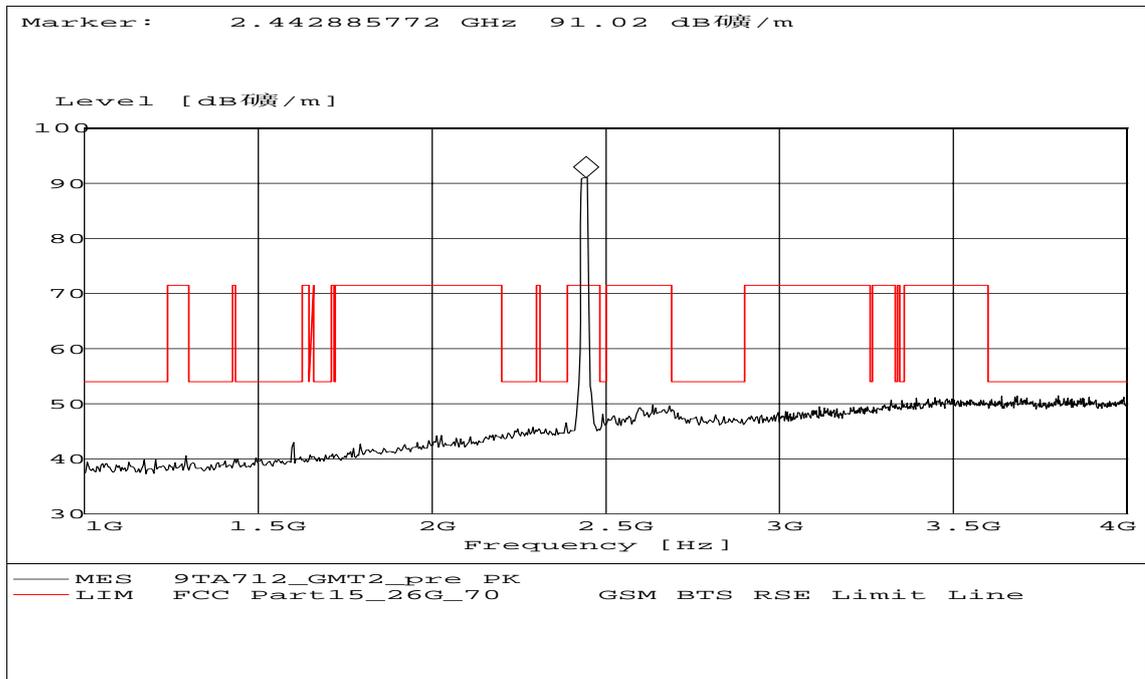


Fig. 44 Radiated Spurious Emission (802.11g, Ch6, 1 GHz-4 GHz)

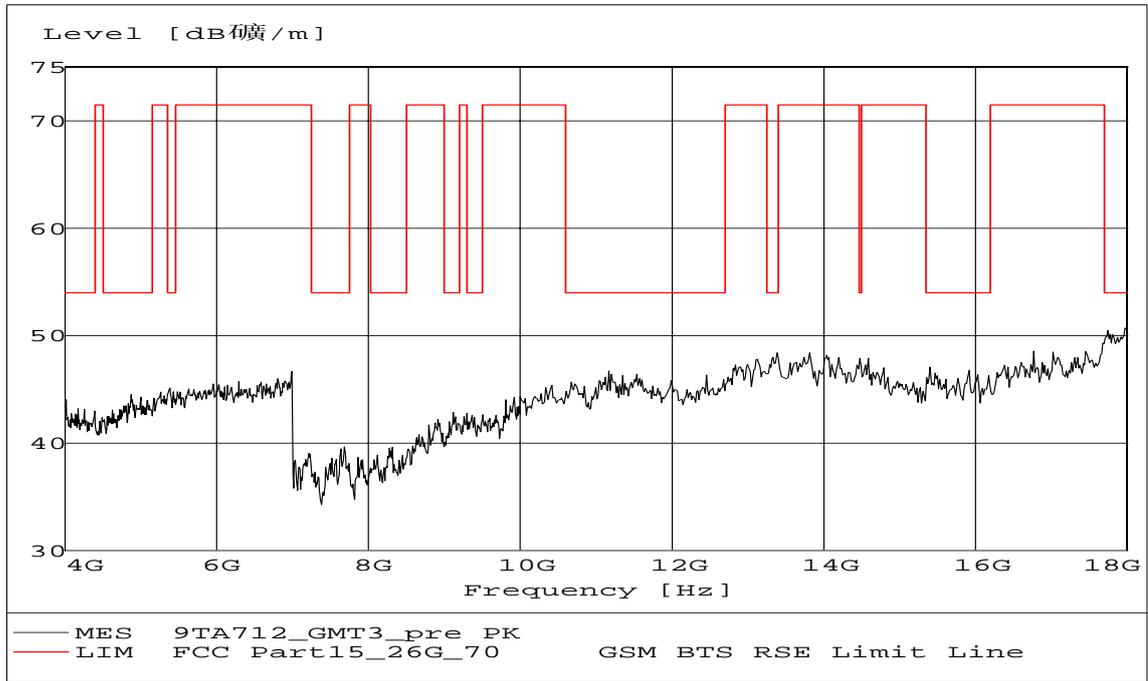


Fig. 45 Radiated Spurious Emission (802.11g, Ch6, 4 GHz-18 GHz)

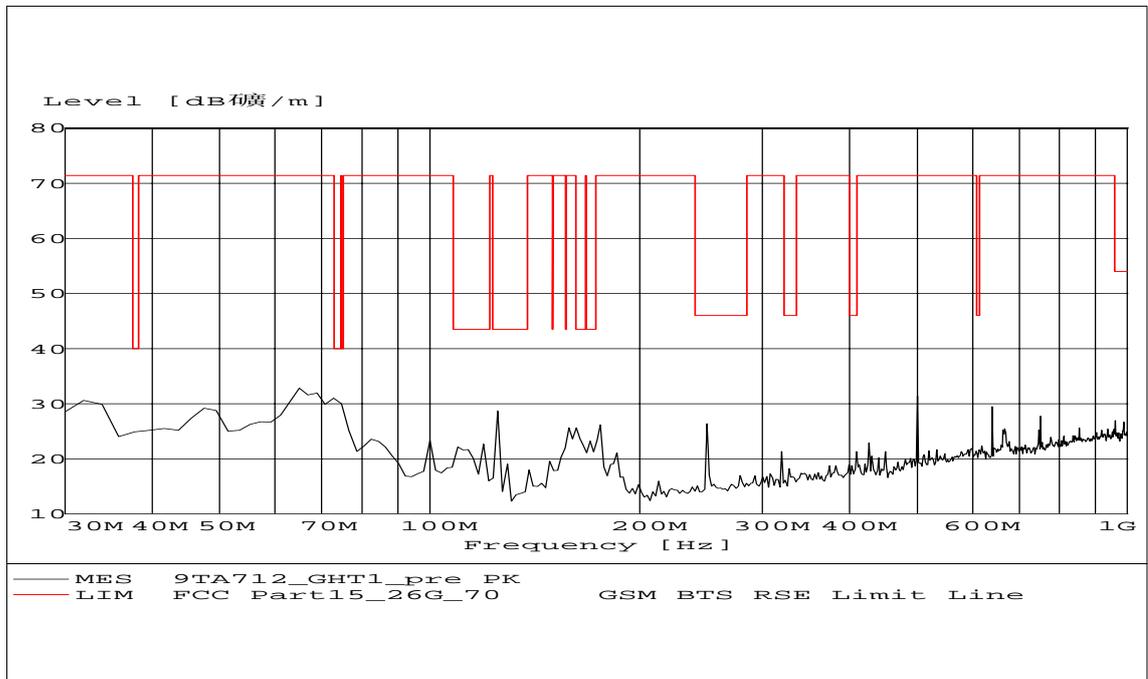


Fig. 46 Radiated Spurious Emission (802.11g, Ch11, 30 MHz-1 GHz)

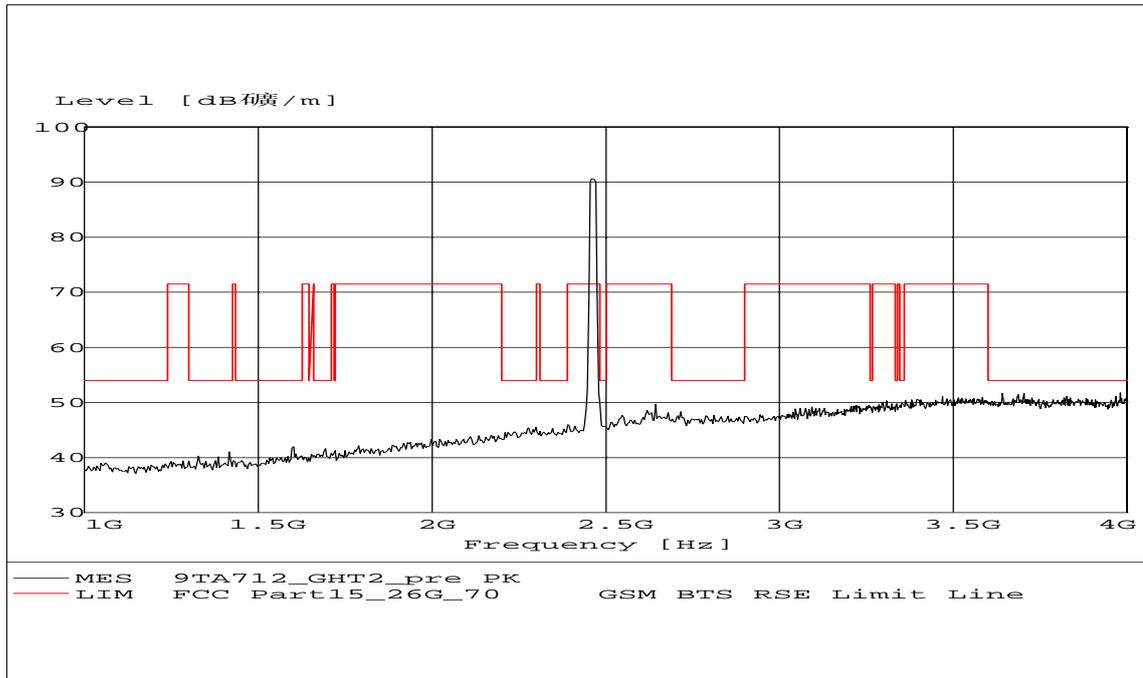


Fig. 47 Radiated Spurious Emission (802.11g, Ch11, 1 GHz-4 GHz)

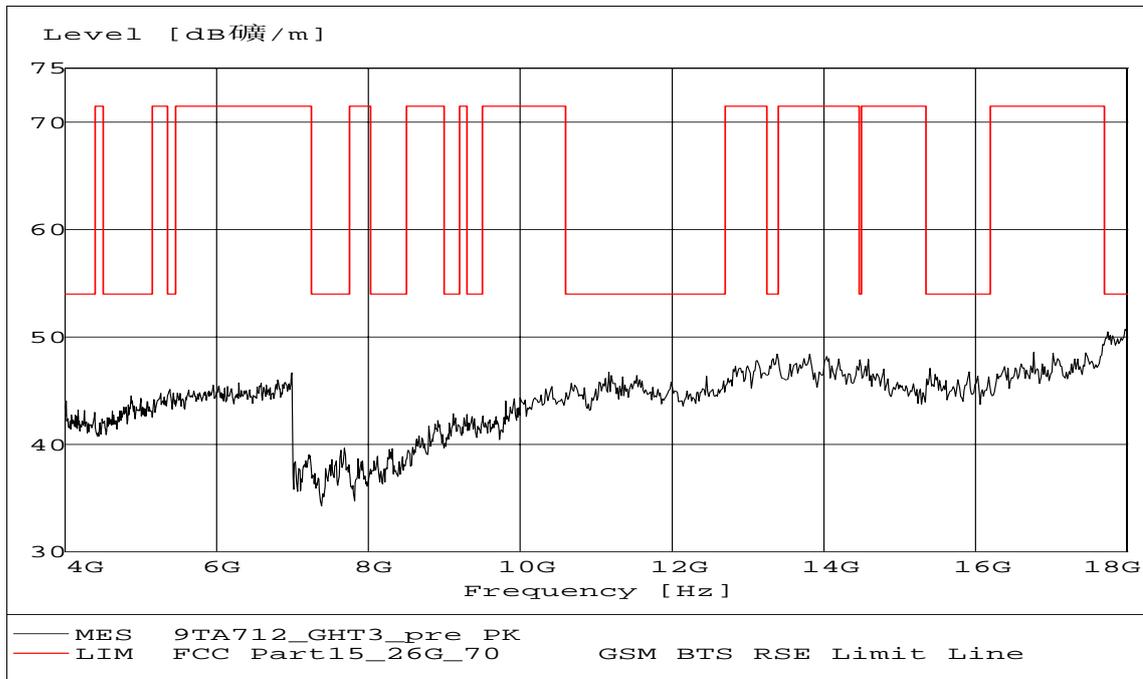


Fig. 48 Radiated Spurious Emission (802.11g, Ch11, 4 GHz-18 GHz)

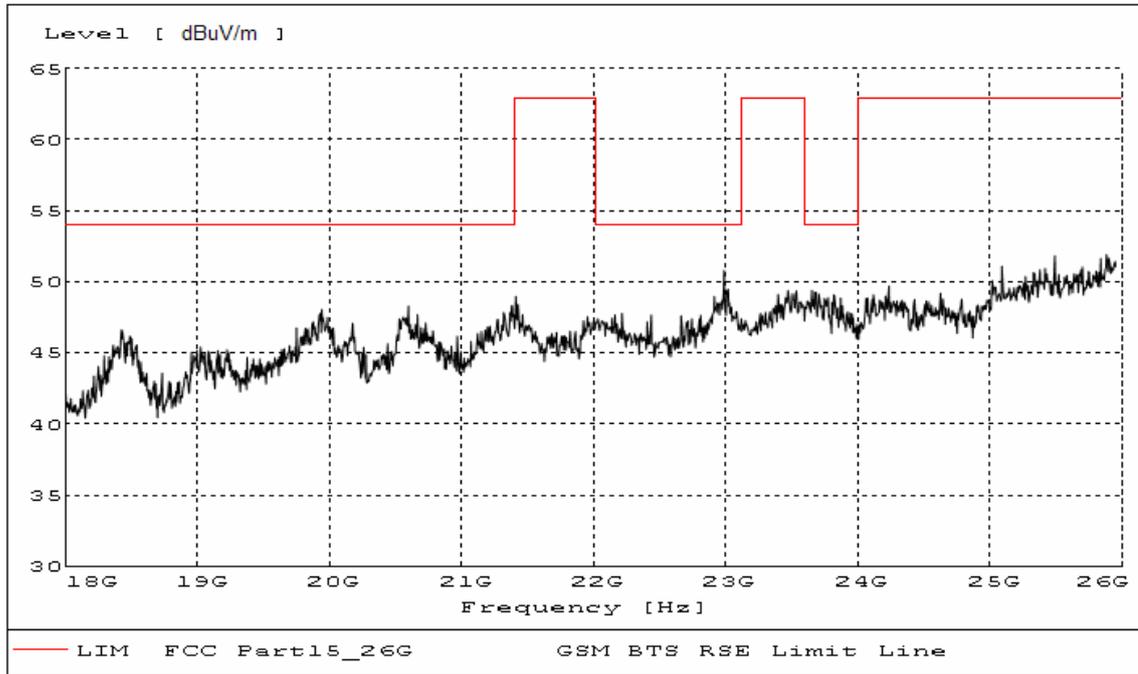


Fig. 49 Radiated emission: 18 GHz - 26 GHz

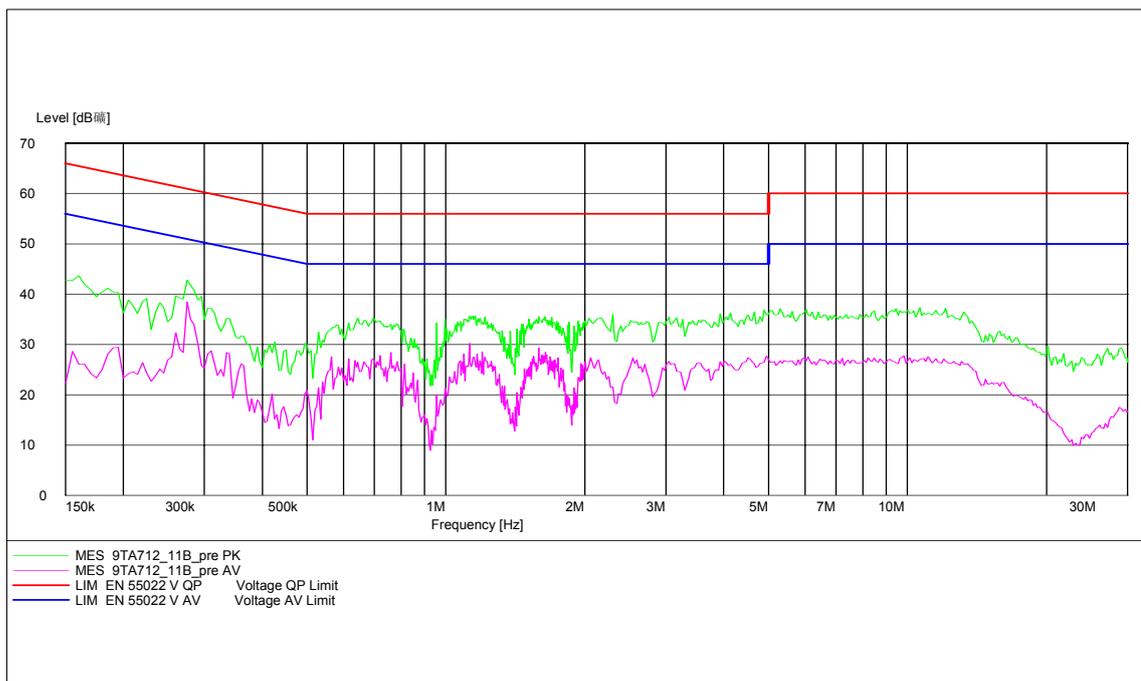


Fig. 50 AC Powerline Conducted Emission - 802.11b mode

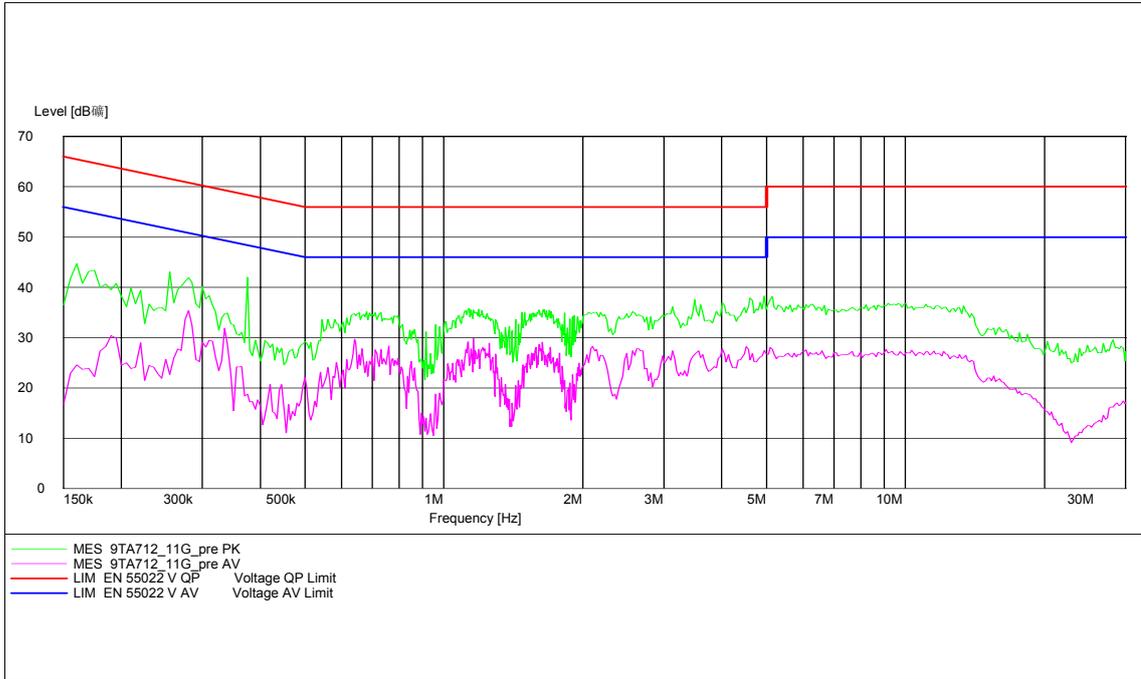


Fig. 51 AC Powerline Conducted Emission - 802.11g mode

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