CHANNEL	Channel 11	**FREQUENCY RANGE**	1 ~ 25GHz
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	26deg. C, 69%RH, 960hPa	**TESTED BY**	Sky Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

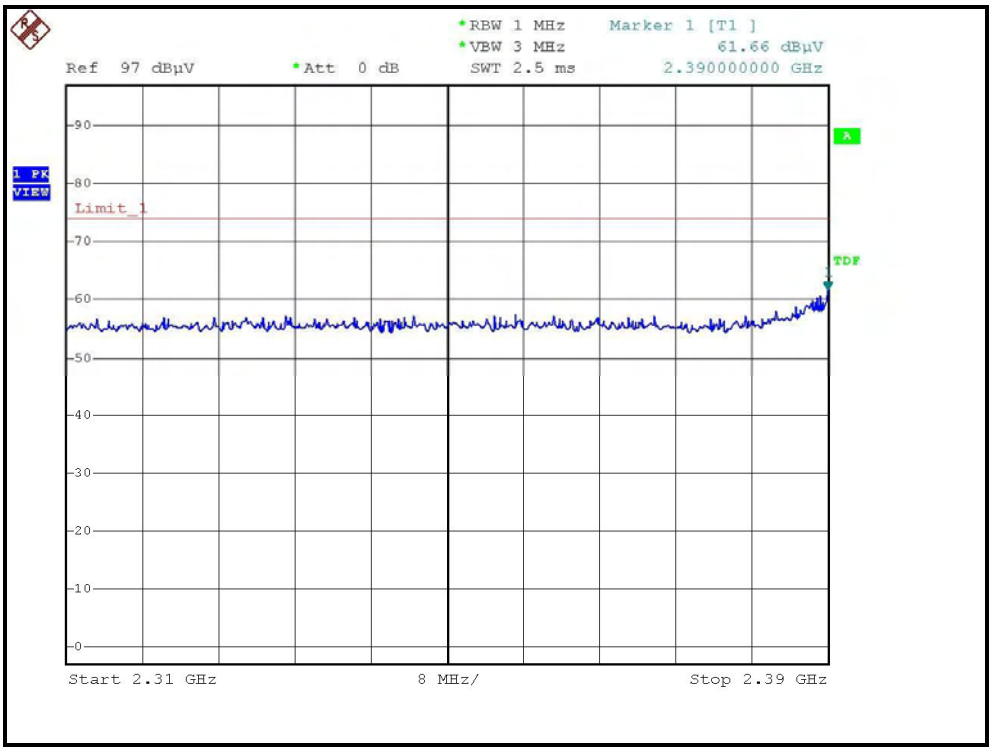
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	98.60 PK			1.27 H	280	67.88	30.72
2	*2462.00	87.90 AV			1.27 H	280	57.18	30.72
3	2483.50	62.09 PK	74.00	-11.91	1.80 H	196	31.27	30.82
4	2483.50	46.55 AV	54.00	-7.45	1.80 H	196	15.73	30.82
5	4924.00	46.20 PK	74.00	-27.80	1.26 H	65	10.30	35.90
6	4924.00	33.40 AV	54.00	-20.60	1.26 H	65	-2.50	35.90
7	7386.00	54.20 PK	74.00	-19.80	1.28 H	64	11.40	42.80
8	7386.00	40.80 AV	54.00	-13.20	1.28 H	64	-2.00	42.80

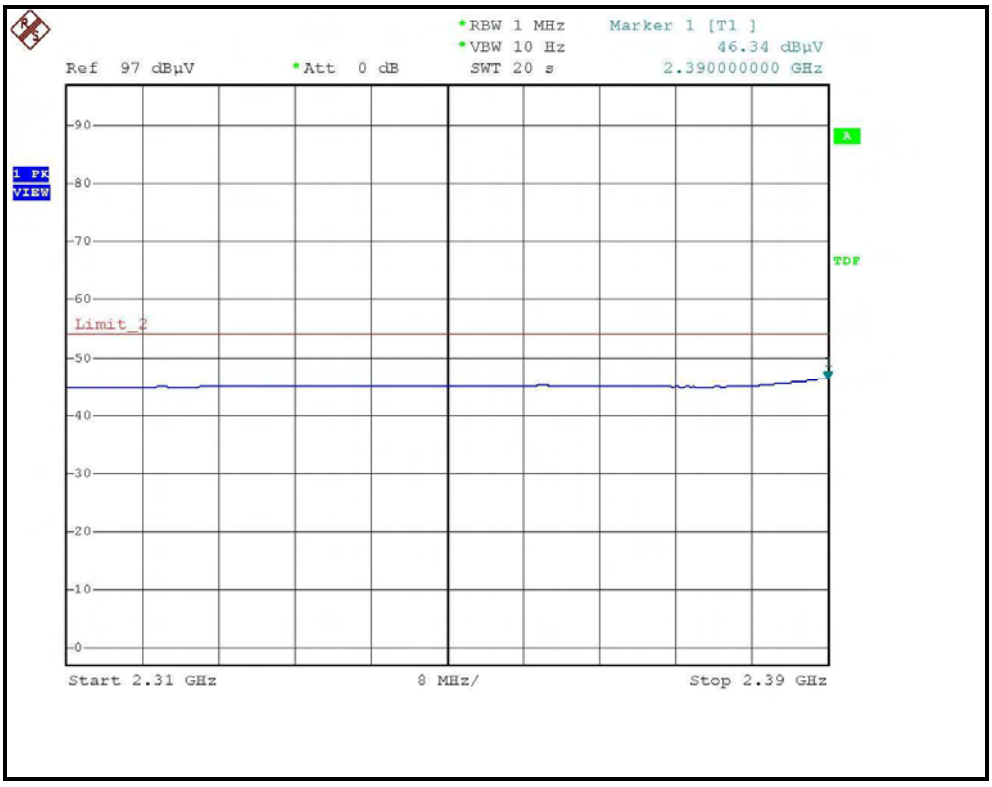
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	108.10 PK			1.73 V	290	77.38	30.72
2	*2462.00	97.50 AV			1.73 V	290	66.78	30.72
3	2483.50	70.23 PK	74.00	-3.77	1.70 V	250	39.41	30.82
4	2483.50	51.83 AV	54.00	-2.17	1.70 V	250	21.01	30.82
5	4924.00	49.40 PK	74.00	-24.60	1.32 V	16	13.50	35.90
6	4924.00	35.20 AV	54.00	-18.80	1.32 V	16	-0.70	35.90
7	7386.00	53.60 PK	74.00	-20.40	1.16 V	22	10.80	42.80
8	7386.00	40.40 AV	54.00	-13.60	1.16 V	22	-2.40	42.80

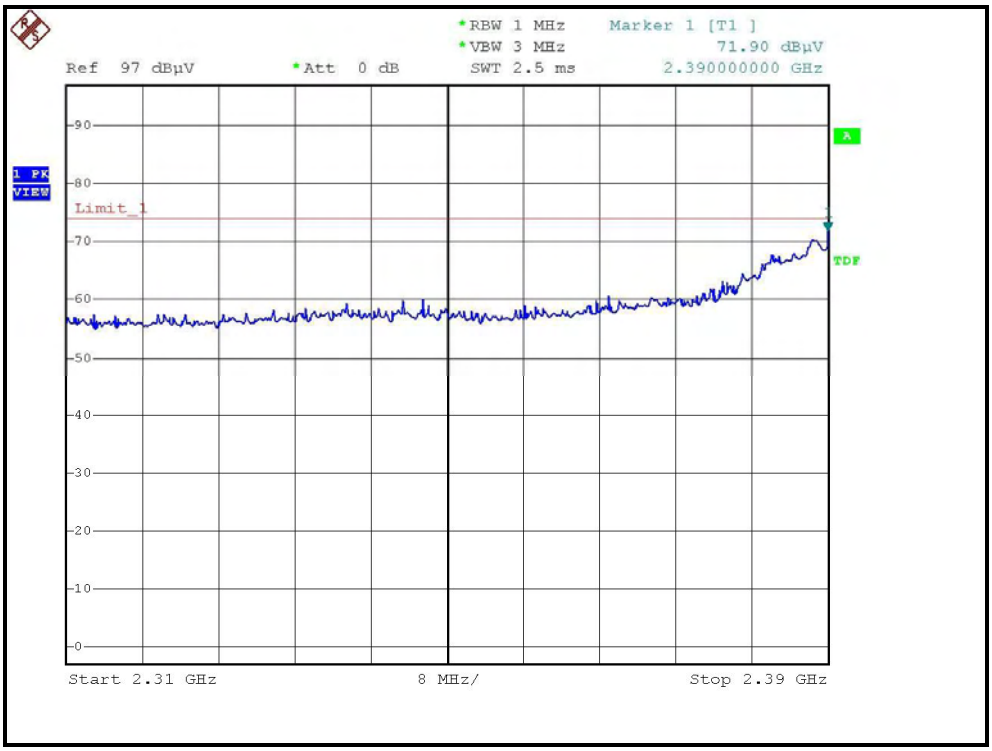
REMARKS:
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. The limit value is defined as per 15.247
6. " * " : Fundamental frequency

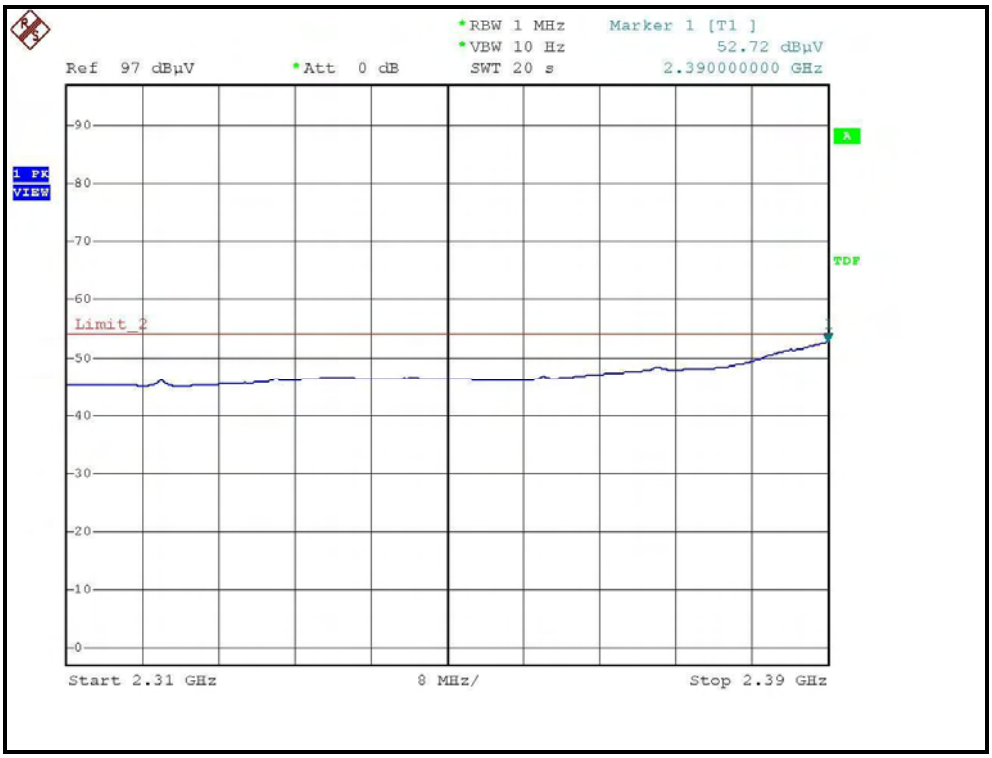
RESTRICTED BANDEDGE (802.11g MODE,CH1, HORIZONTAL)



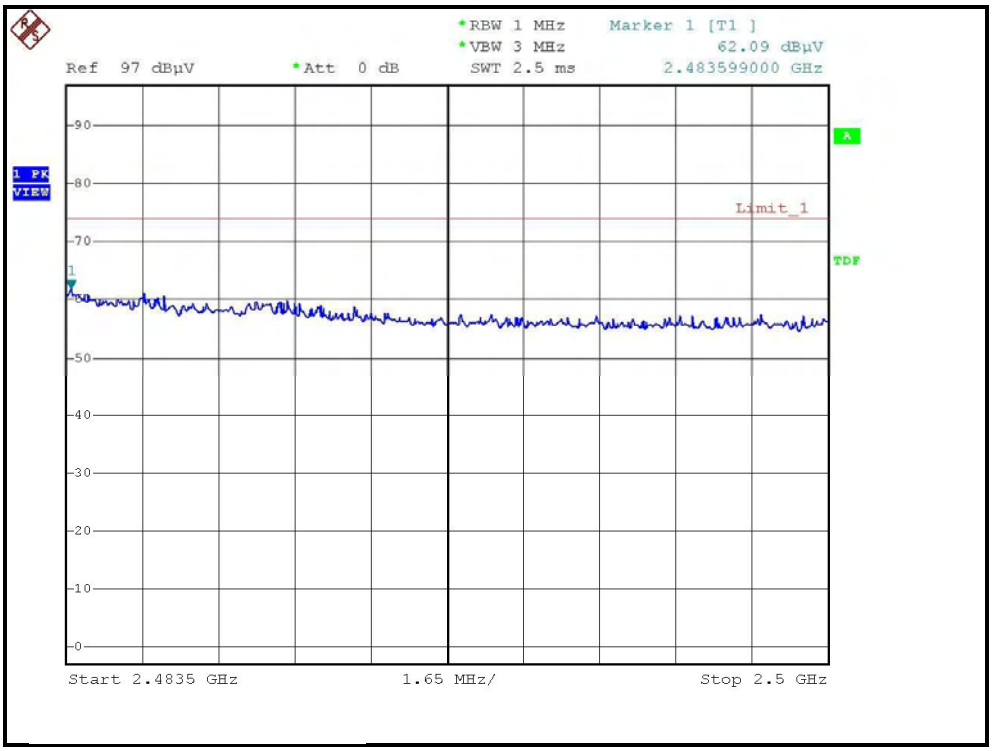


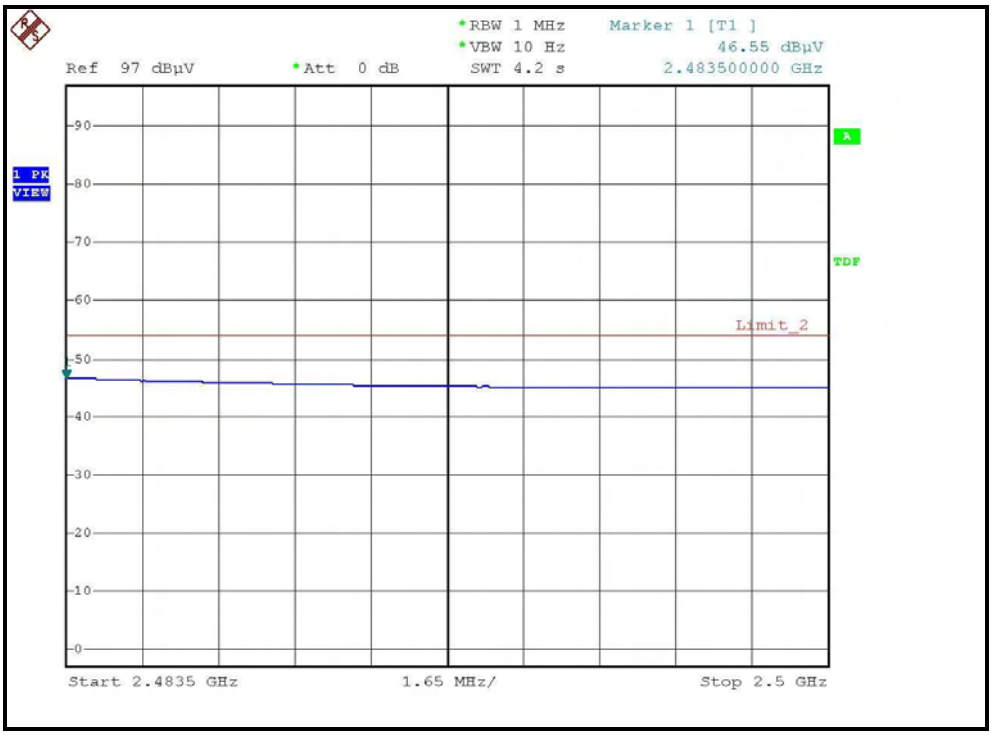
RESTRICTED BANDEDGE (802.11g MODE,CH1, VERTICAL)



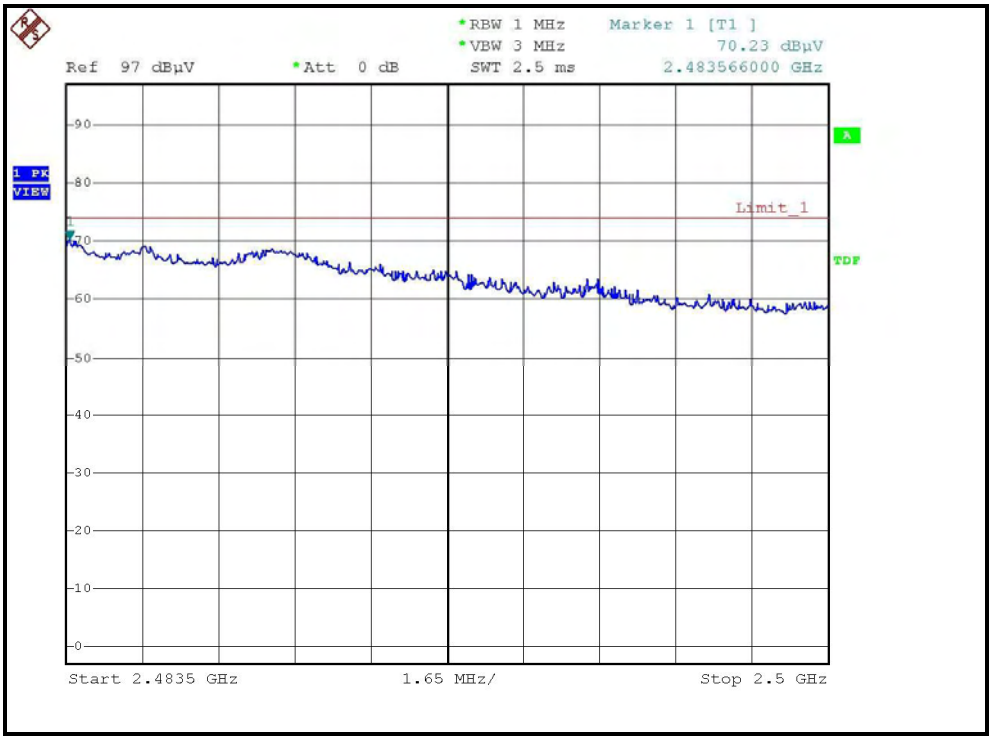


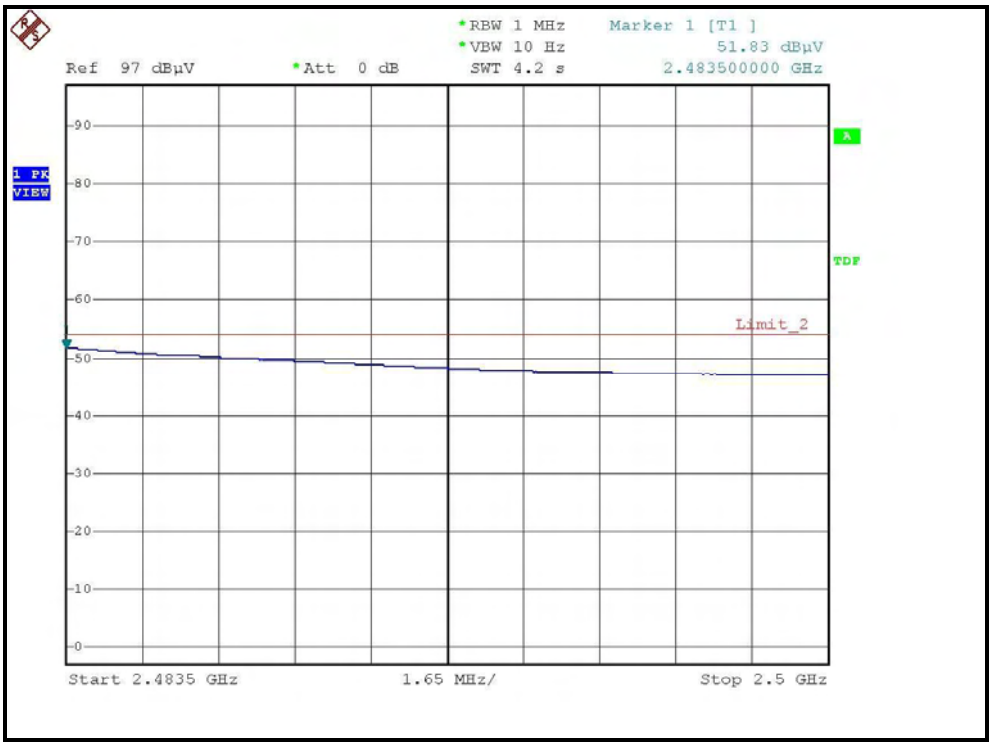
RESTRICTED BANDEDGE (802.11g MODE,CH11, HORIZONTAL)



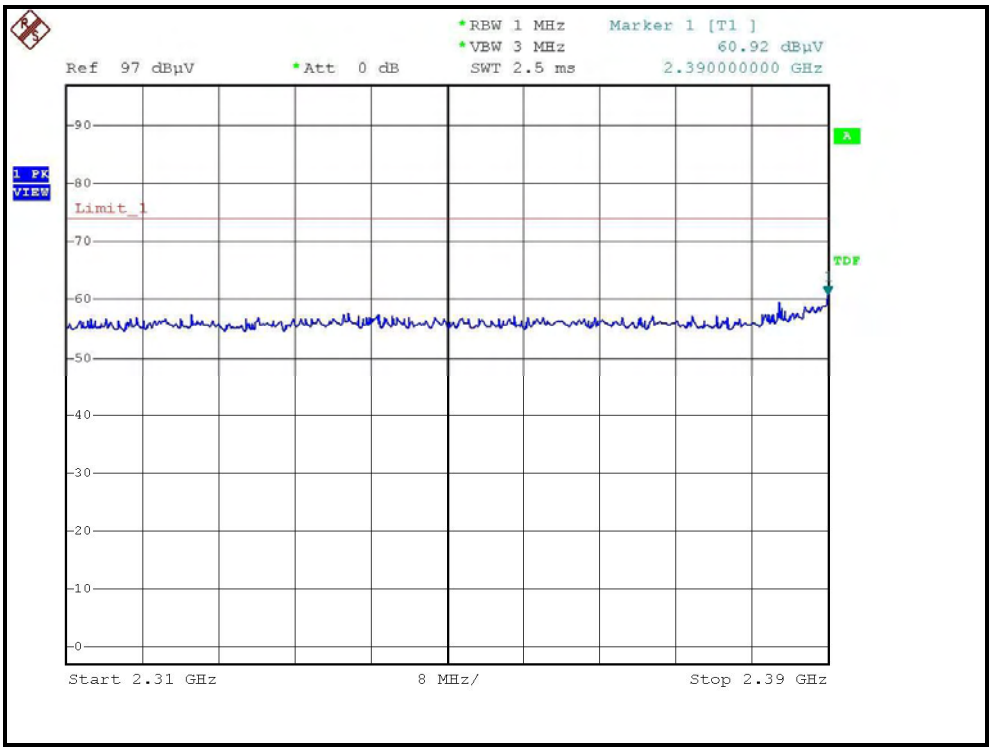


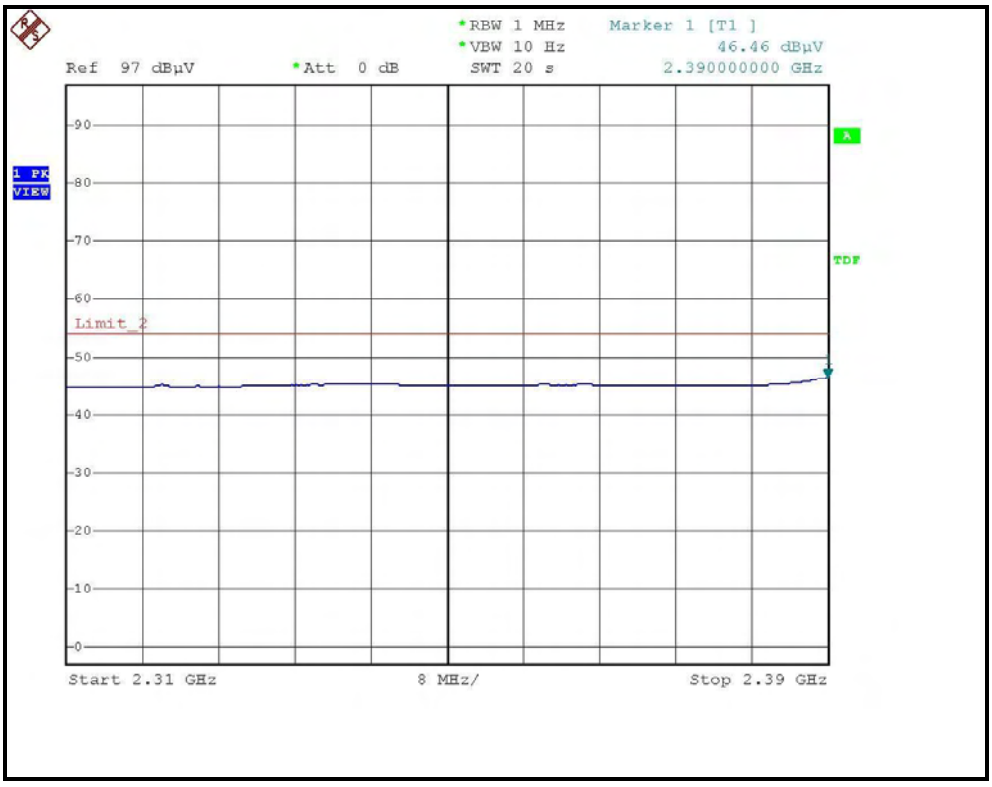
RESTRICTED BANDEDGE (802.11g MODE,CH11, VERTICAL)



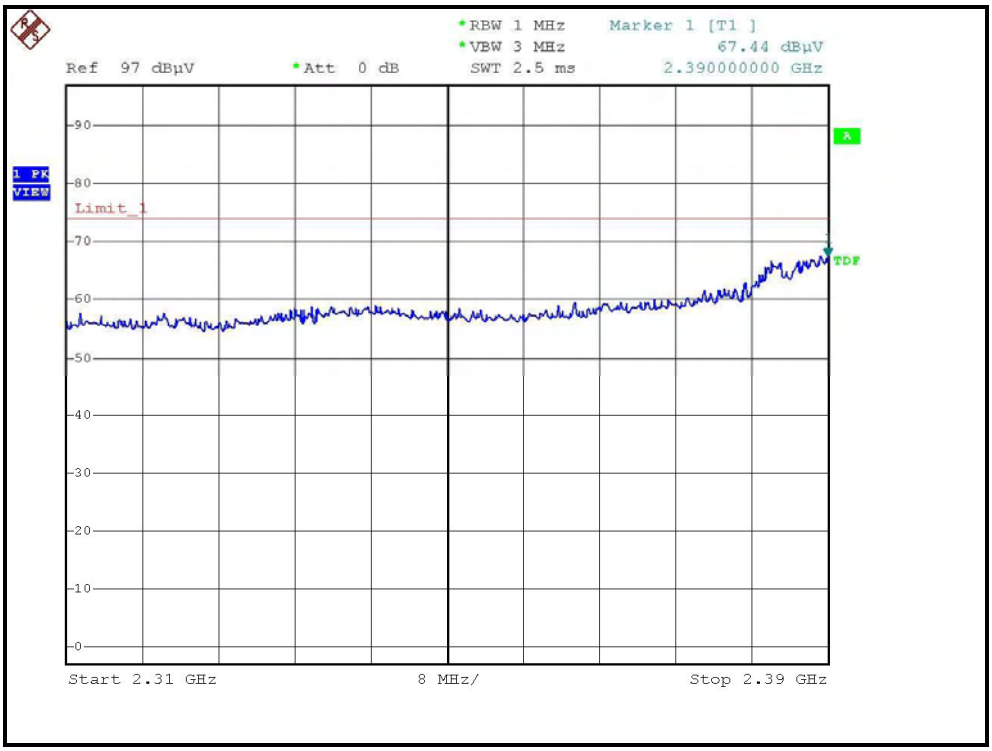


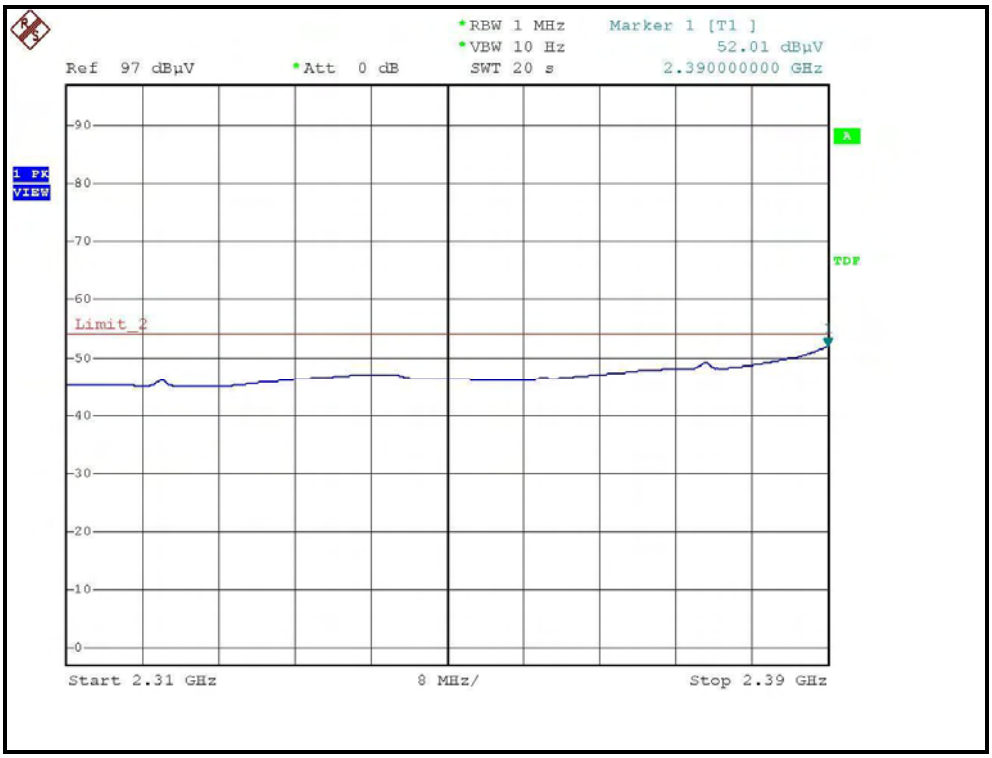
RESTRICTED BANDEDGE (802.11b MODE,CH2, HORIZONTAL)



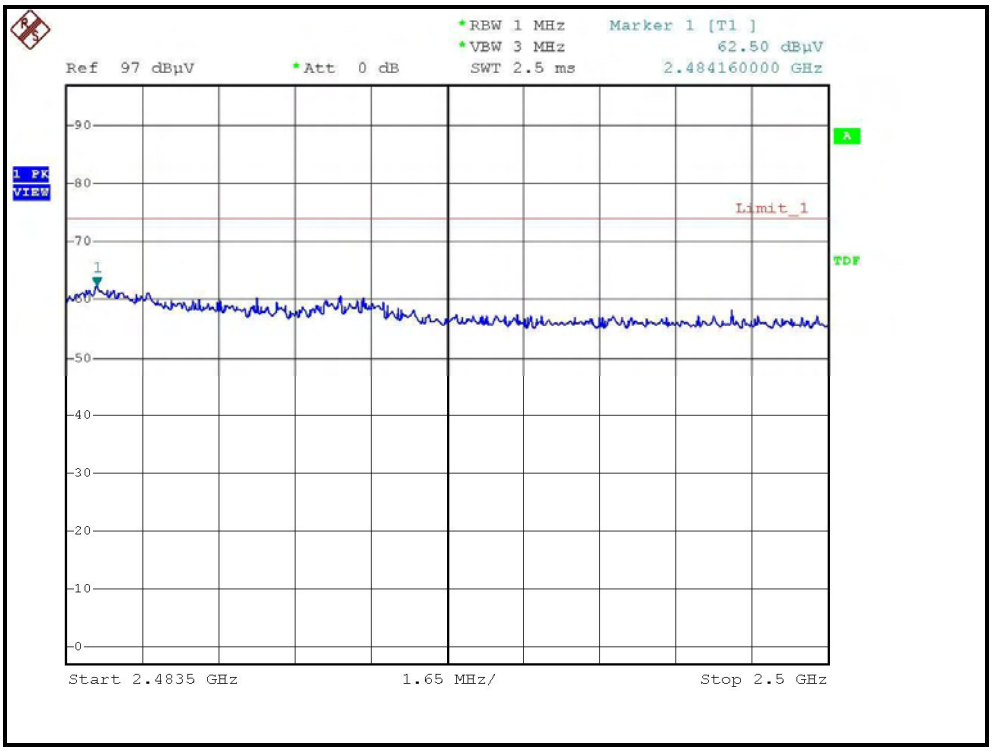


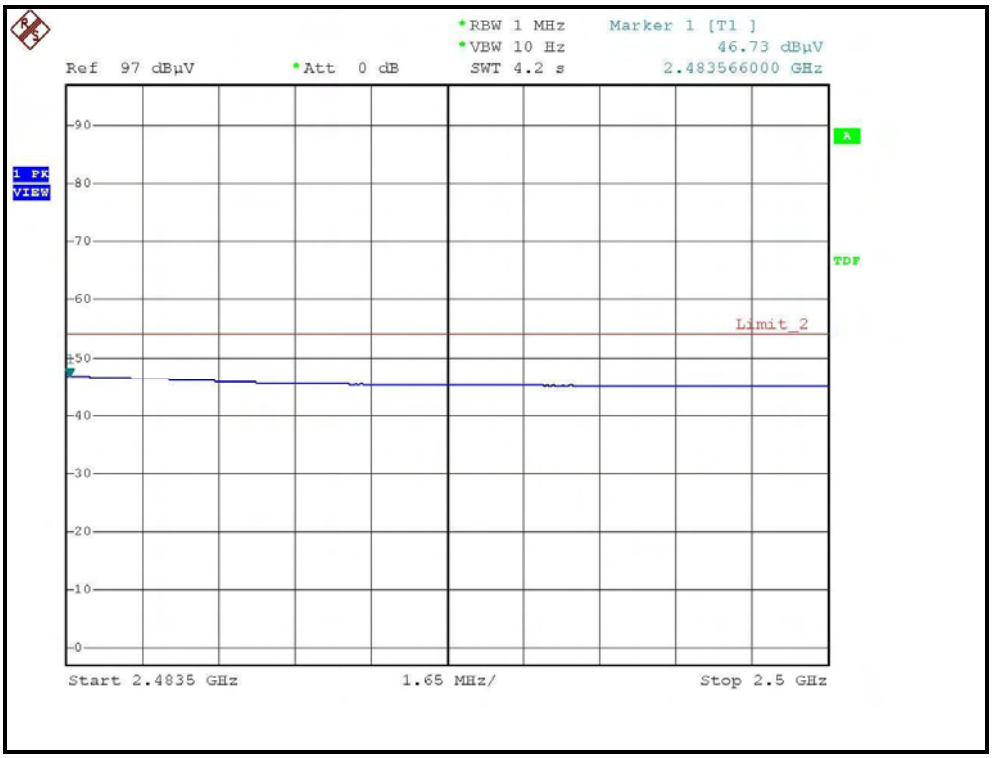
RESTRICTED BANDEDGE (802.11b MODE,CH2, VERTICAL)



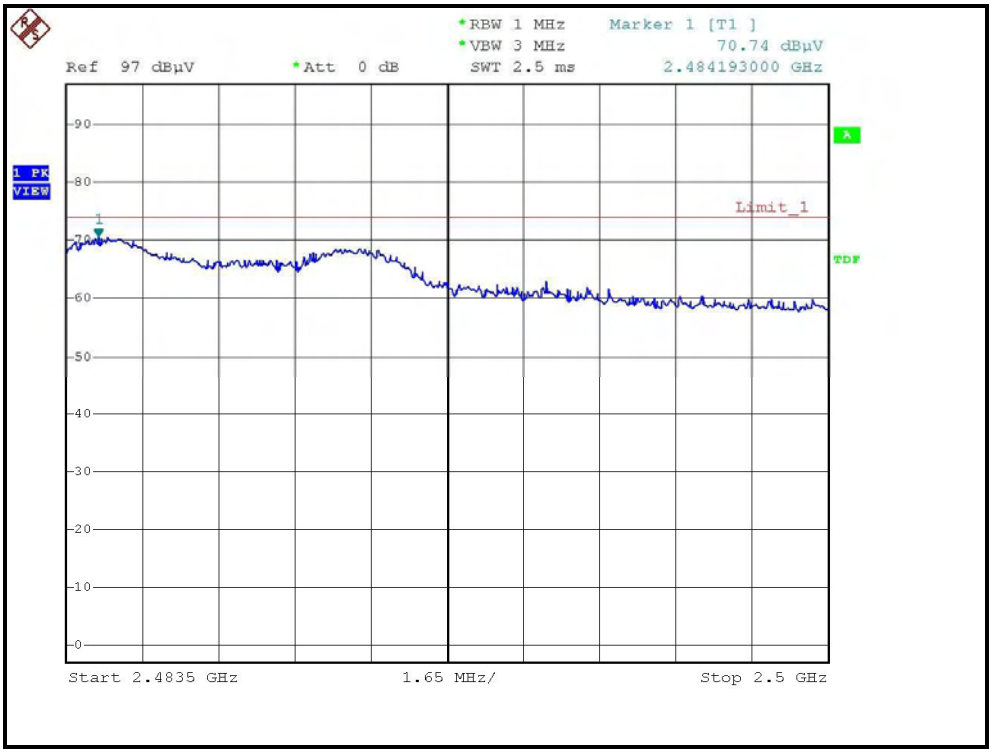


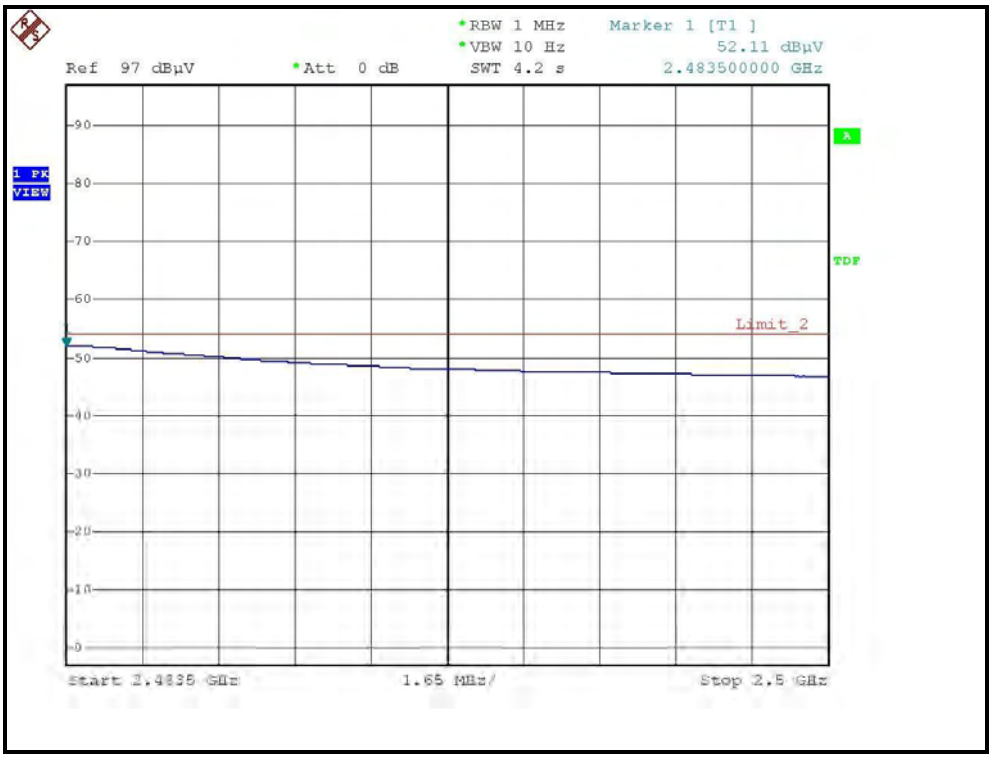
RESTRICTED BANDEDGE (802.11b MODE,CH10, HORIZONTAL)



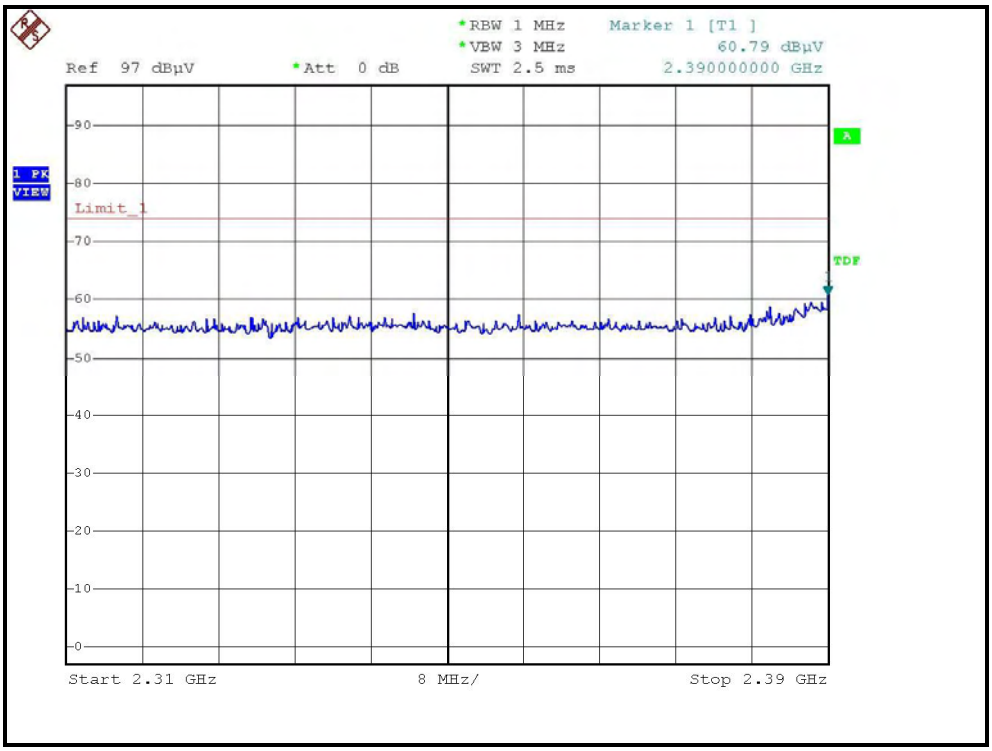


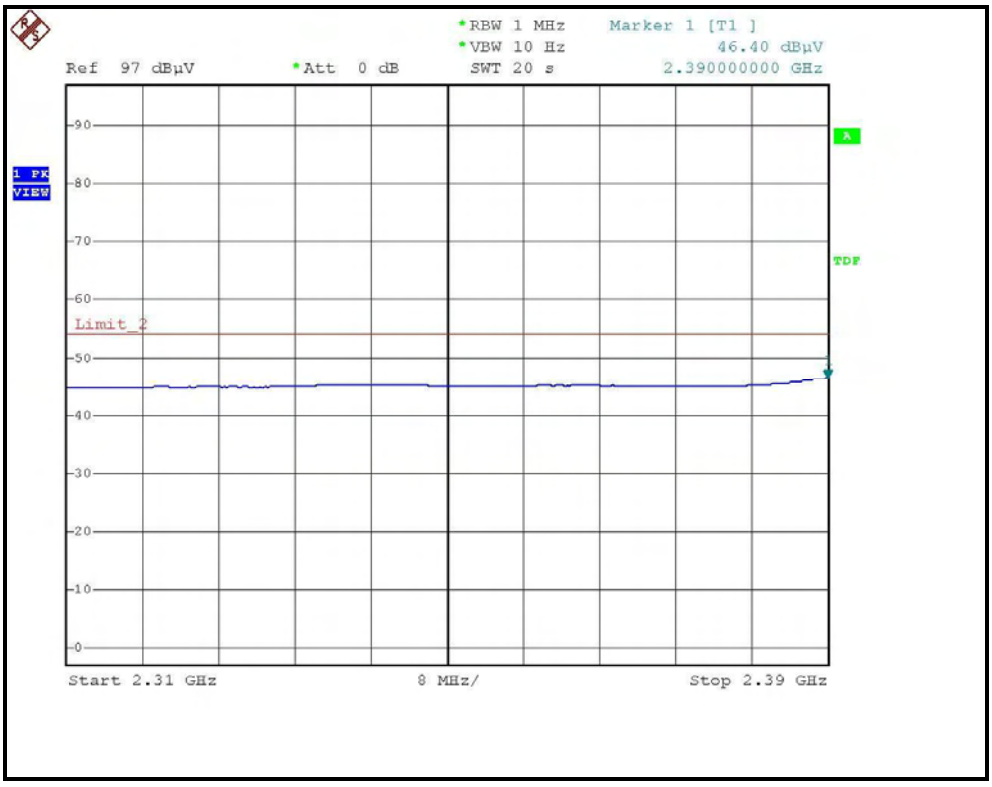
RESTRICTED BANDEDGE (802.11b MODE,CH10, VERTICAL)



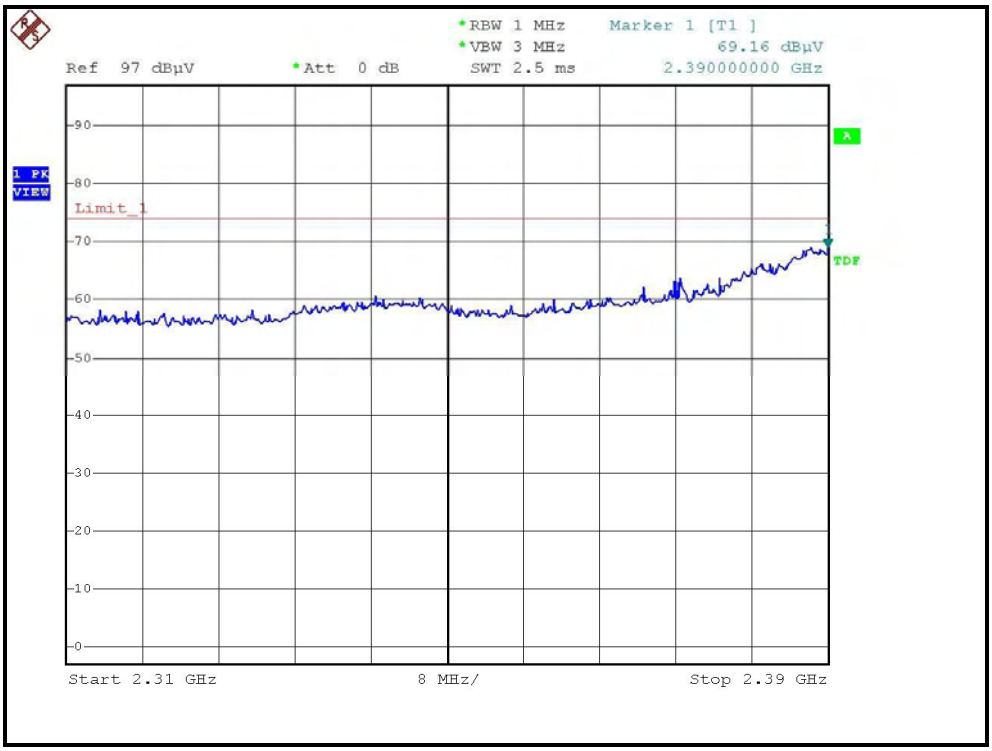


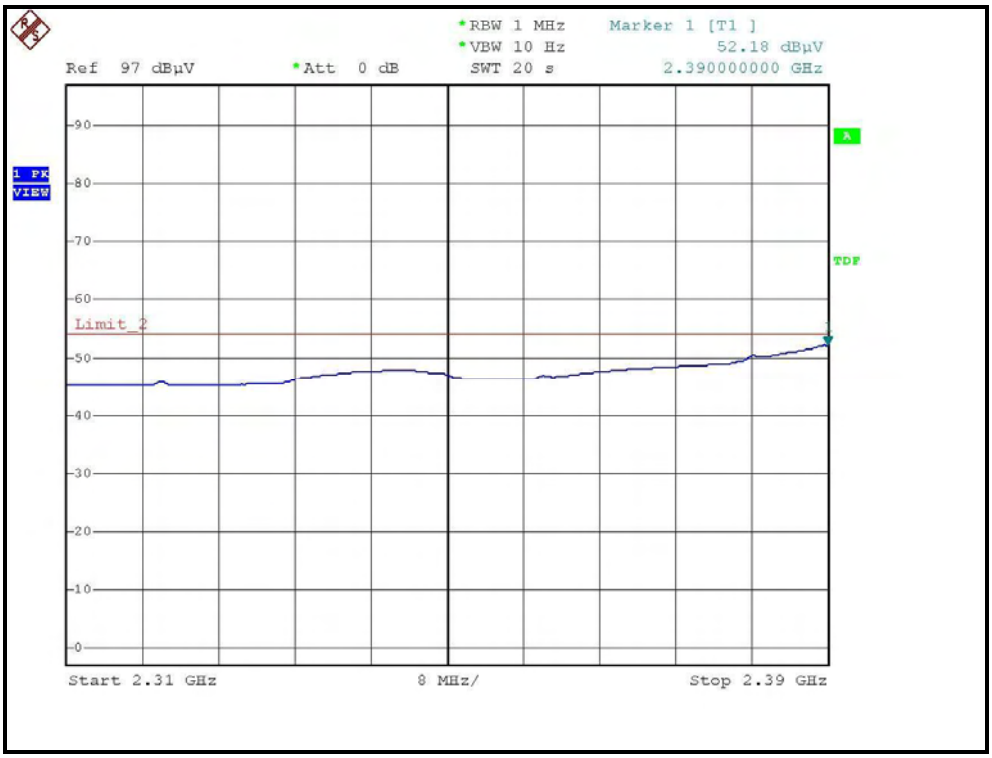
RESTRICTED BANDEDGE (802.11b MODE,CH3, HORIZONTAL)



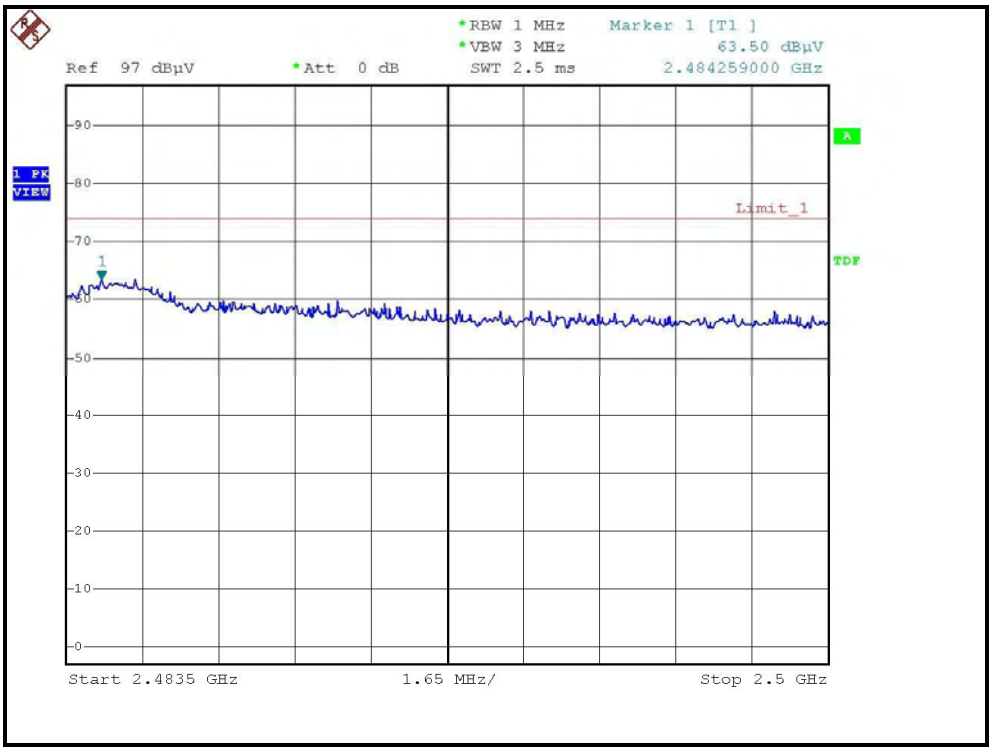


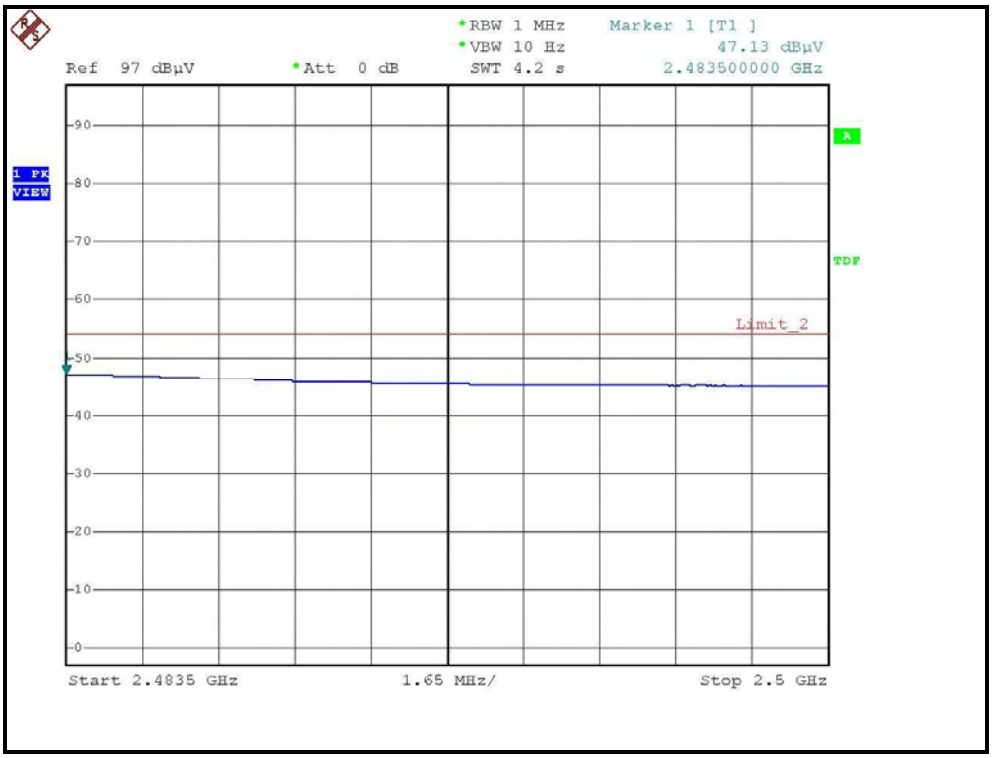
RESTRICTED BANDEDGE (802.11b MODE,CH3, VERTICAL)



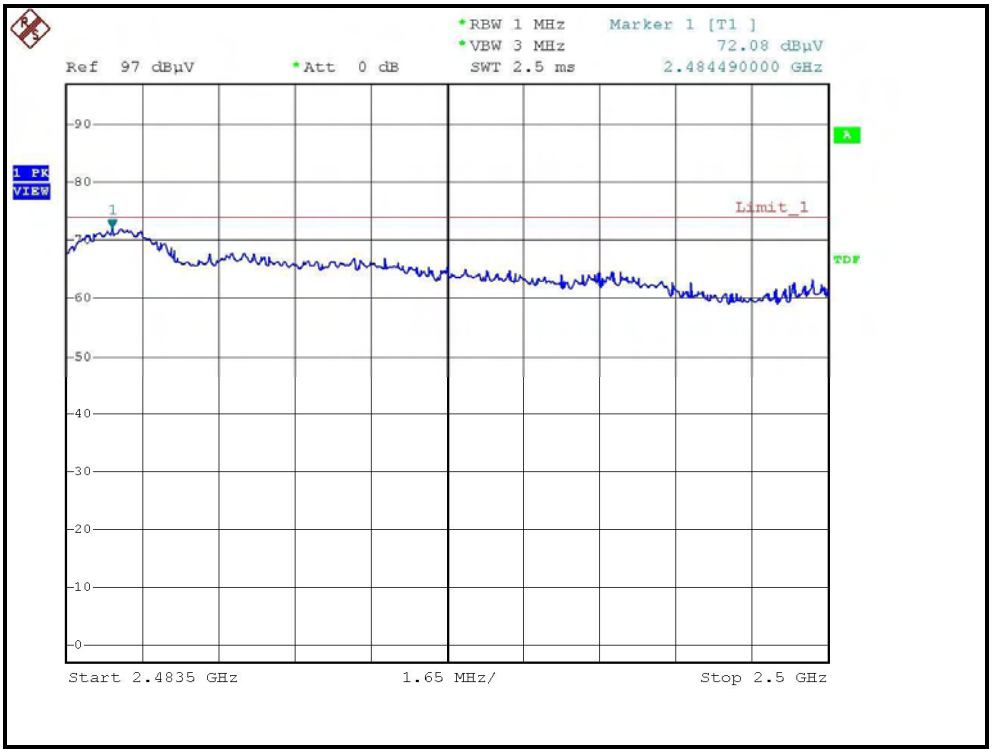


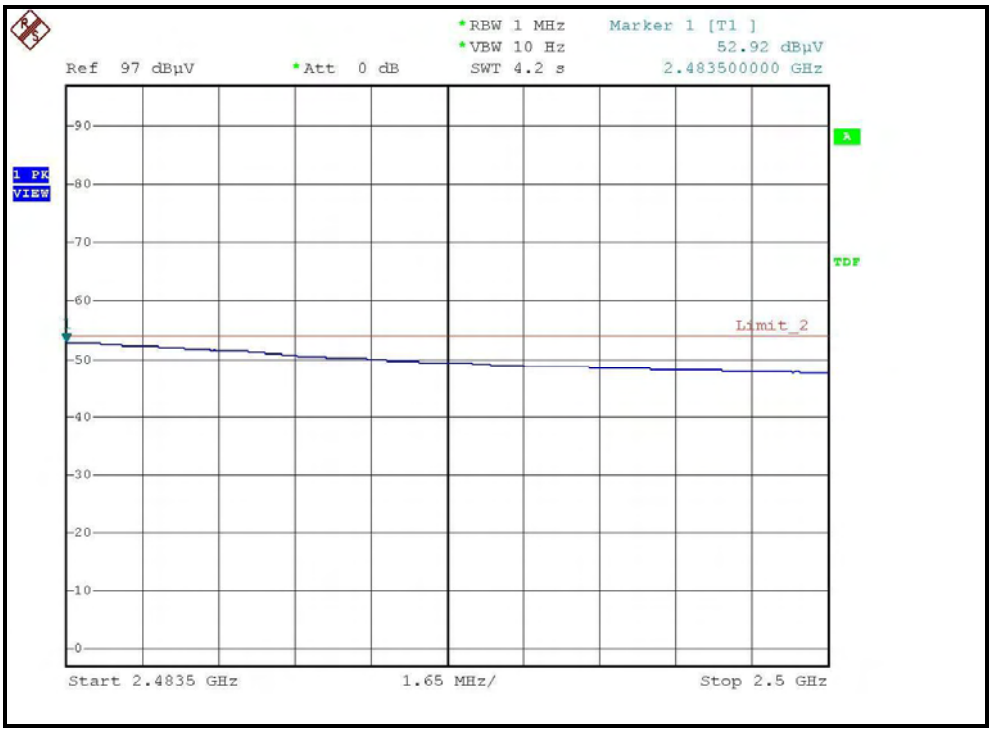
RESTRICTED BANDEDGE (802.11b MODE,CH9, HORIZONTAL)



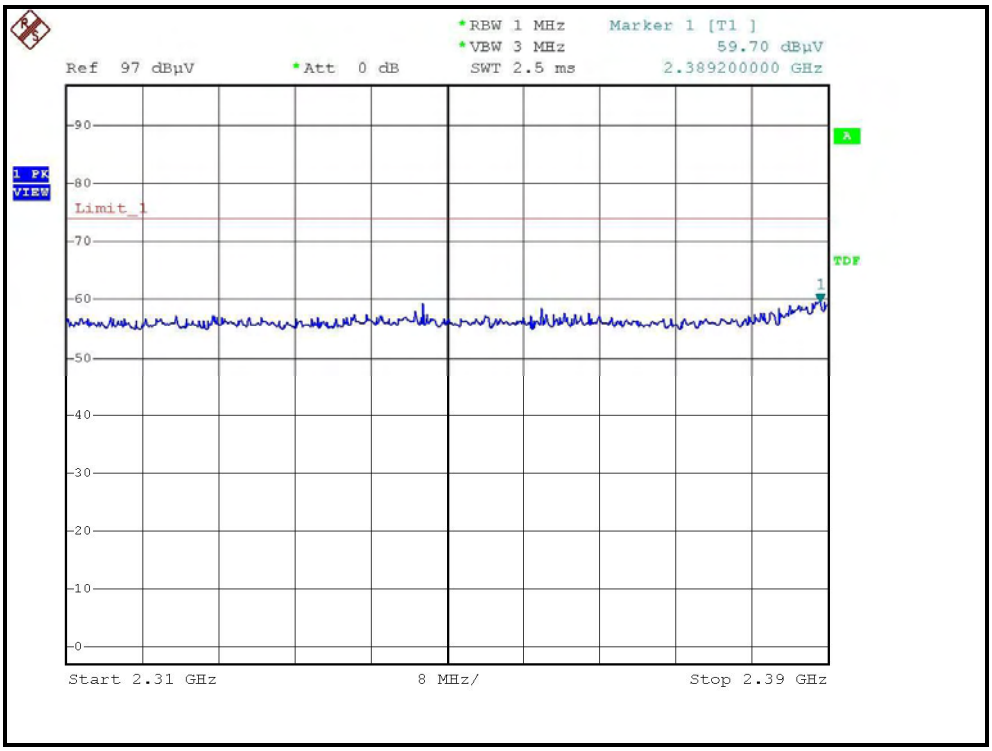


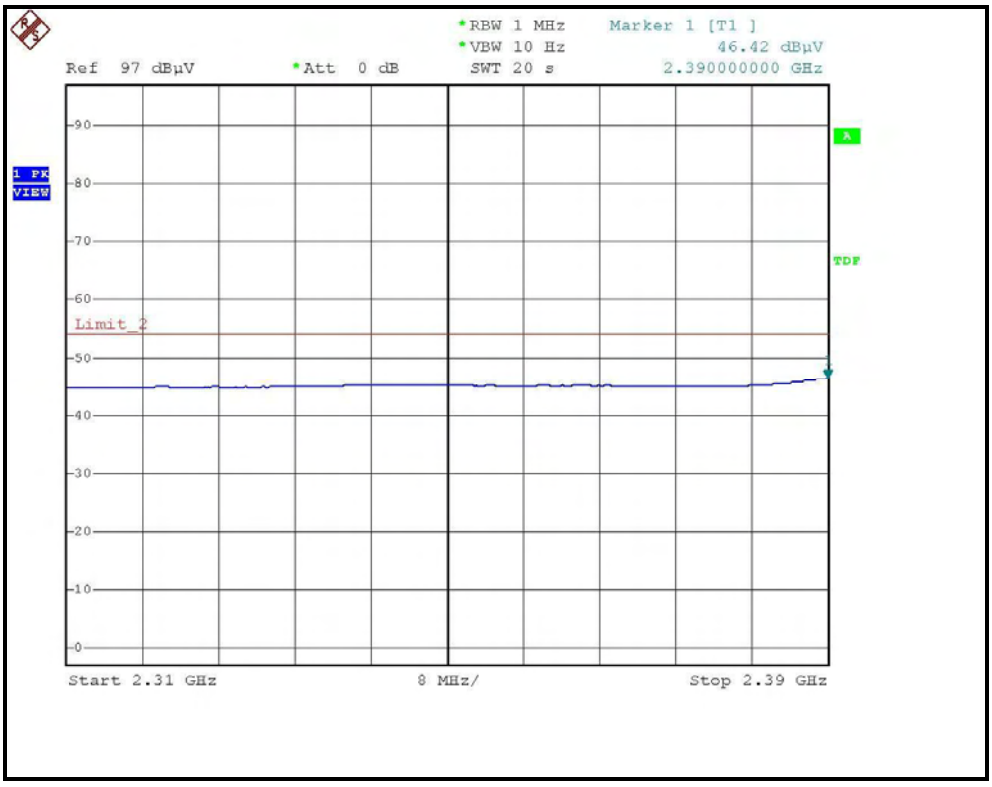
RESTRICTED BANDEDGE (802.11b MODE,CH9, VERTICAL)



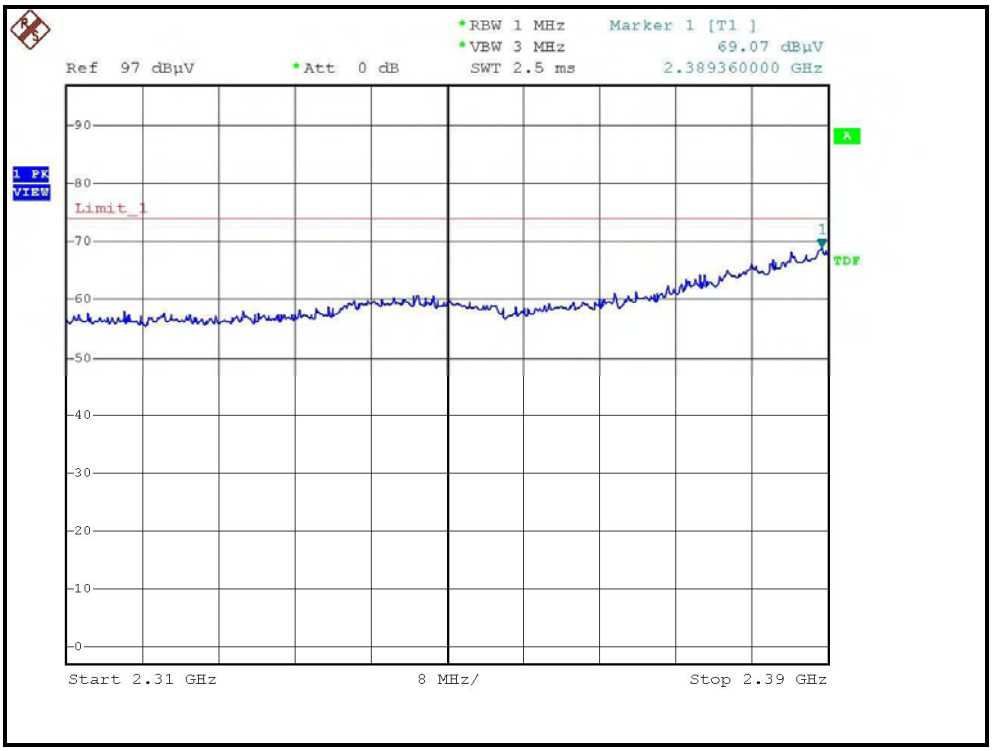


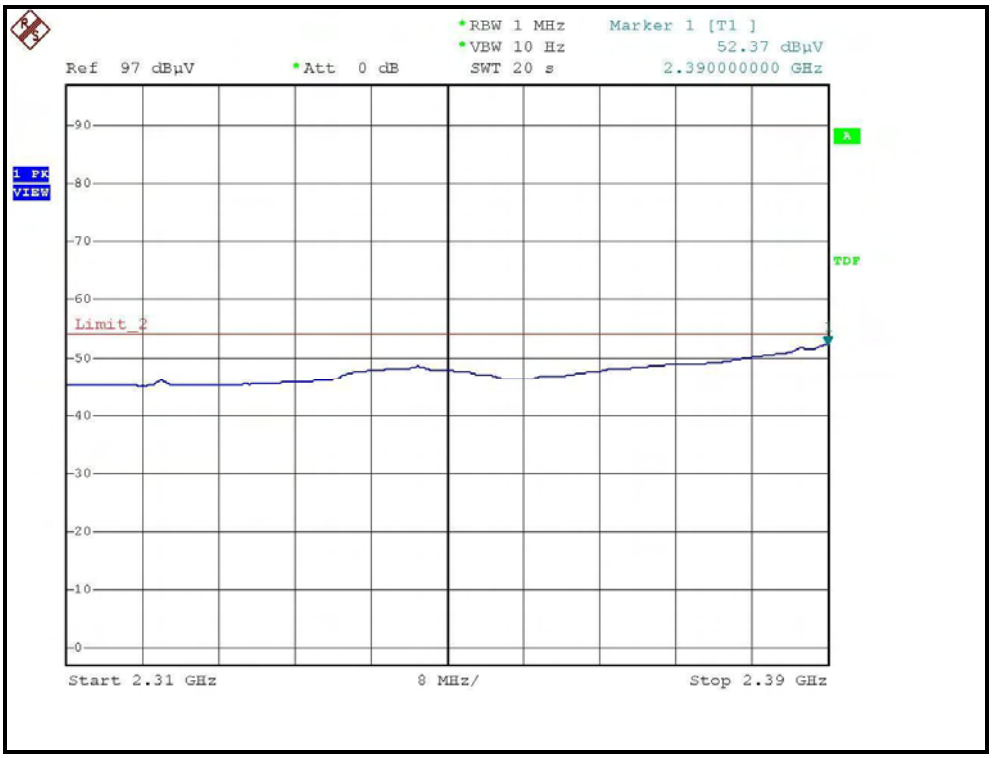
RESTRICTED BANDEDGE (802.11b MODE,CH4, HORIZONTAL)



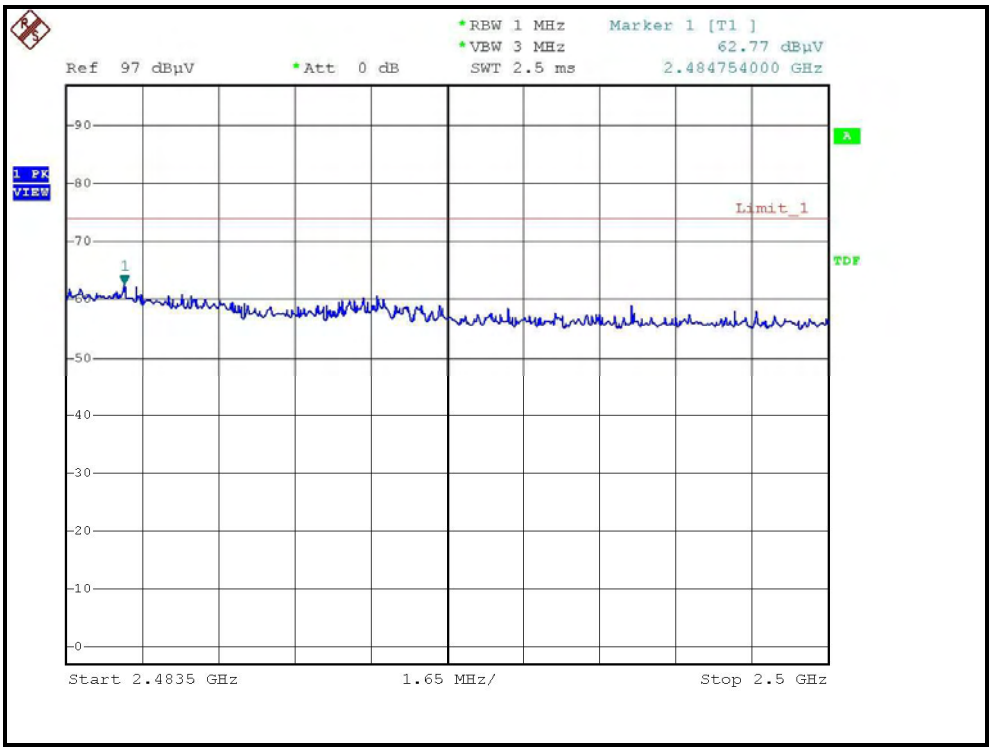


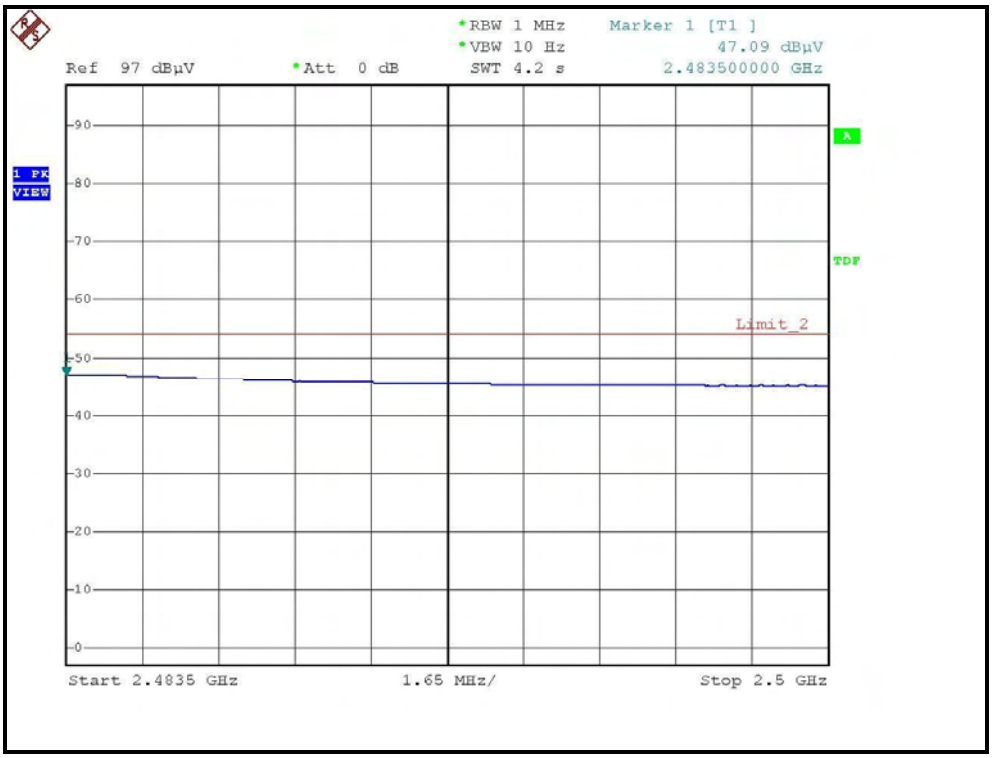
RESTRICTED BANDEDGE (802.11b MODE,CH4, VERTICAL)



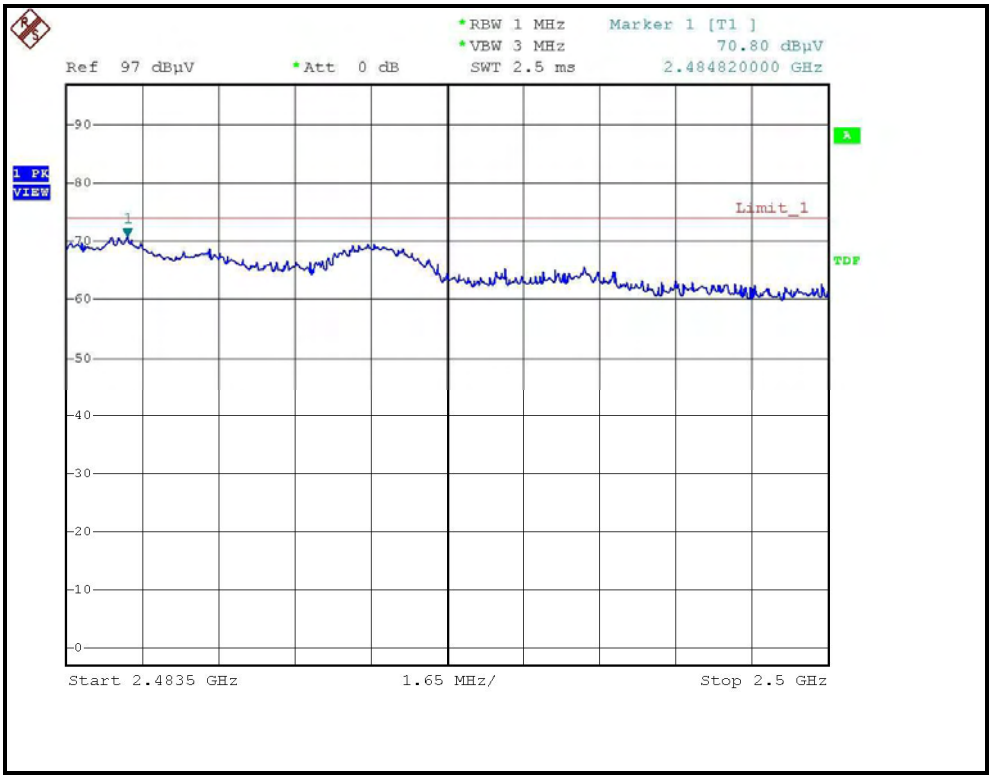


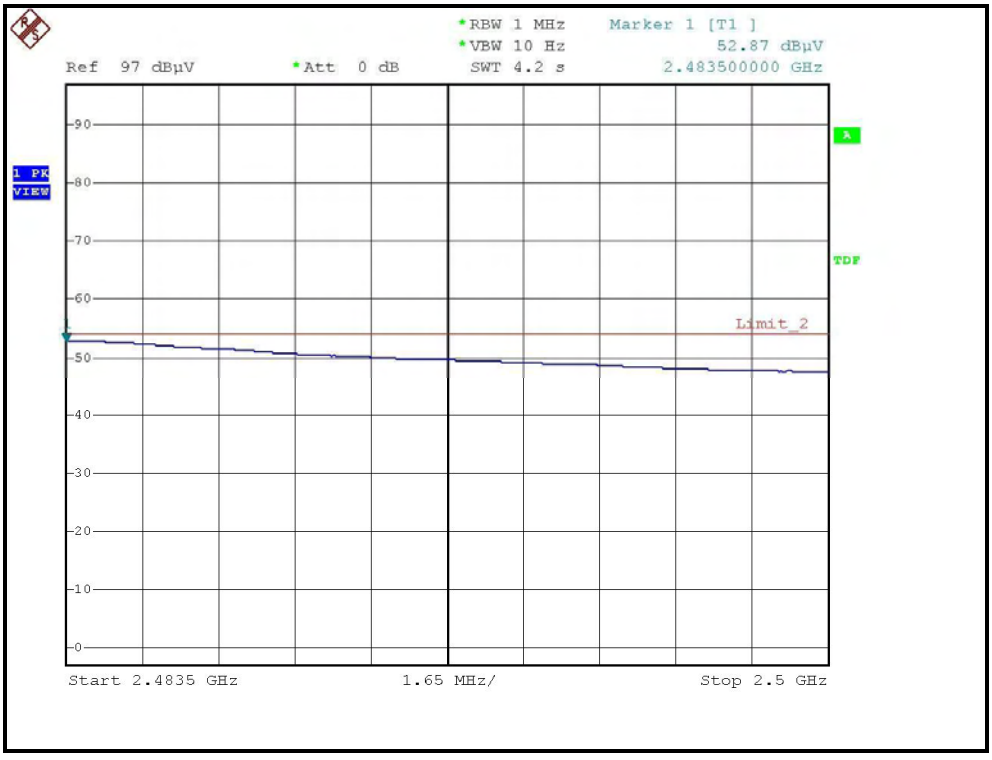
RESTRICTED BANDEDGE (802.11b MODE,CH8, HORIZONTAL)





RESTRICTED BANDEDGE (802.11b MODE,CH8, VERTICAL)





4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

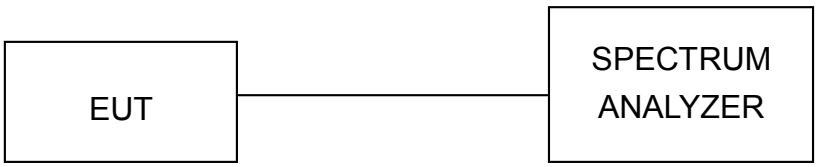
4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

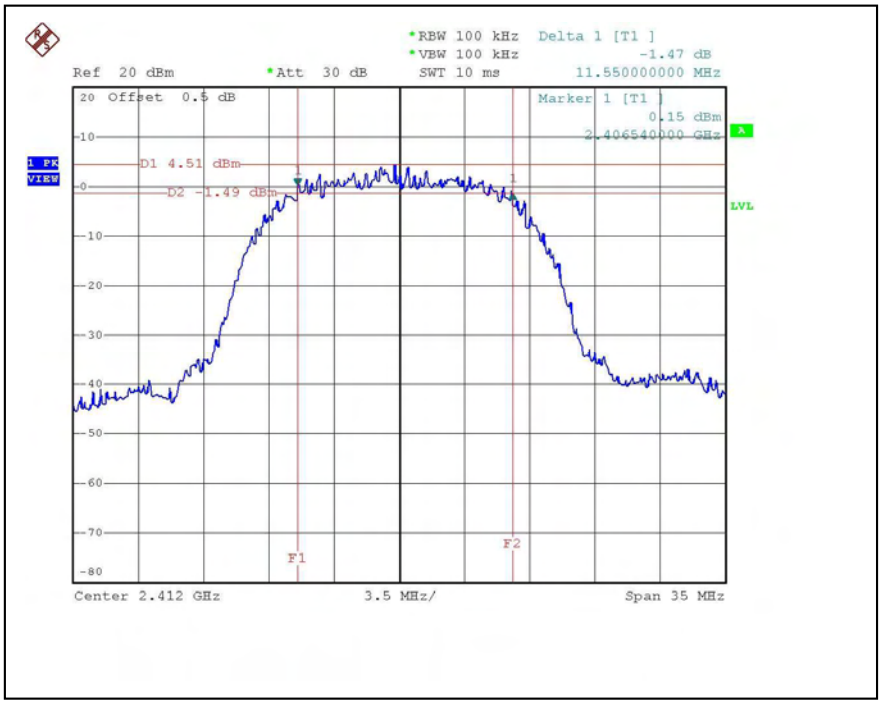
4.3.7 TEST RESULTS

802.11b DSSS modulation

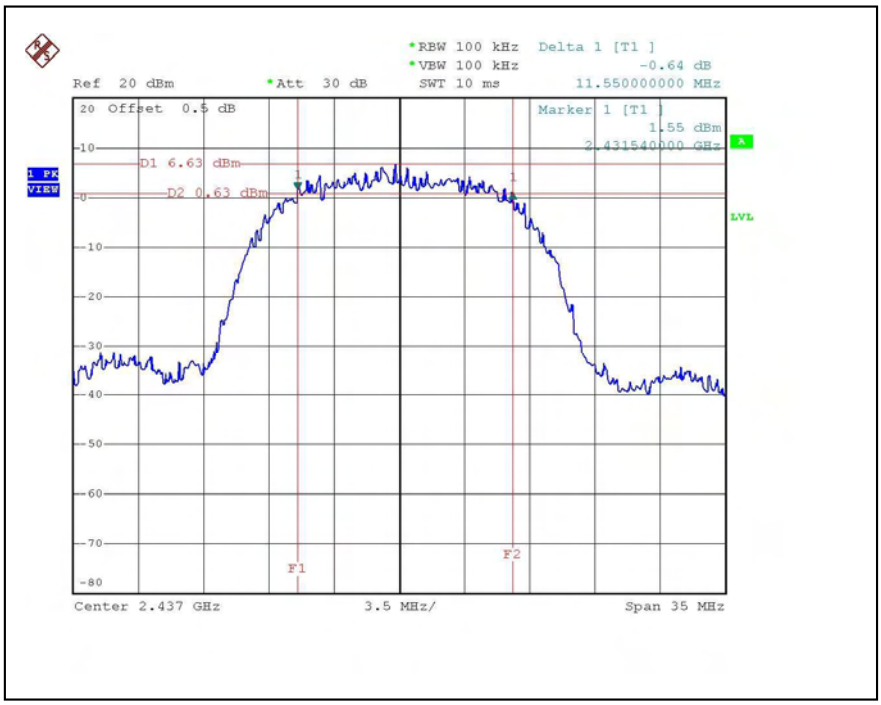
MODULATION TYPE	CCK	**TRANSFER RATE**	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 62%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	11.55	0.5	PASS
6	2437	11.55	0.5	PASS
11	2462	11.13	0.5	PASS

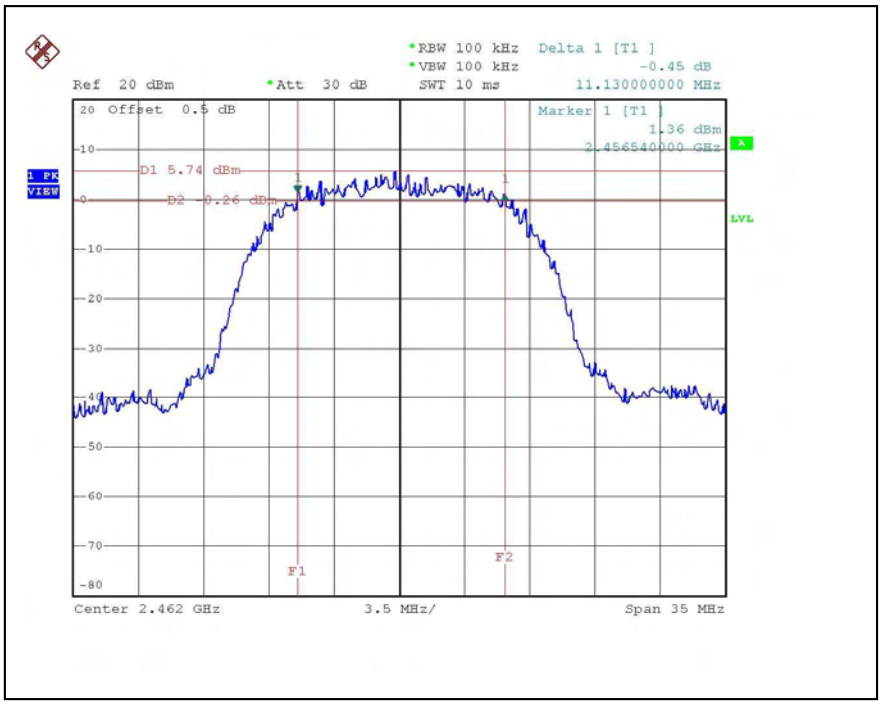
CH1


RBW 100 kHz
VBW 100 kHz
SWT 10 ms
Delta 1 [T1]
-1.47 dB
11.550000000 MHz
Ref 20 dBm
Att 30 dB
20 Offset 0.5 dB
Marker 1 [T1]
0.15 dBm
2.406540000 GHz
D1 4.51 dBm
D2 -1.49 dBm
1 PK VIEW
LVL
F1
F2
Center 2.412 GHz
3.5 MHz/
Span 35 MHz

CH6


RBW 100 kHz
VBW 100 kHz
SWT 10 ms
Delta 1 [T1]
-0.64 dB
11.550000000 MHz
Ref 20 dBm
Att 30 dB
20 Offset 0.5 dB
Marker 1 [T1]
1.55 dBm
2.431540000 GHz
D1 6.63 dBm
D2 0.63 dBm
1 PK VIEW
LVL
F1
F2
Center 2.437 GHz
3.5 MHz/
Span 35 MHz

CH11

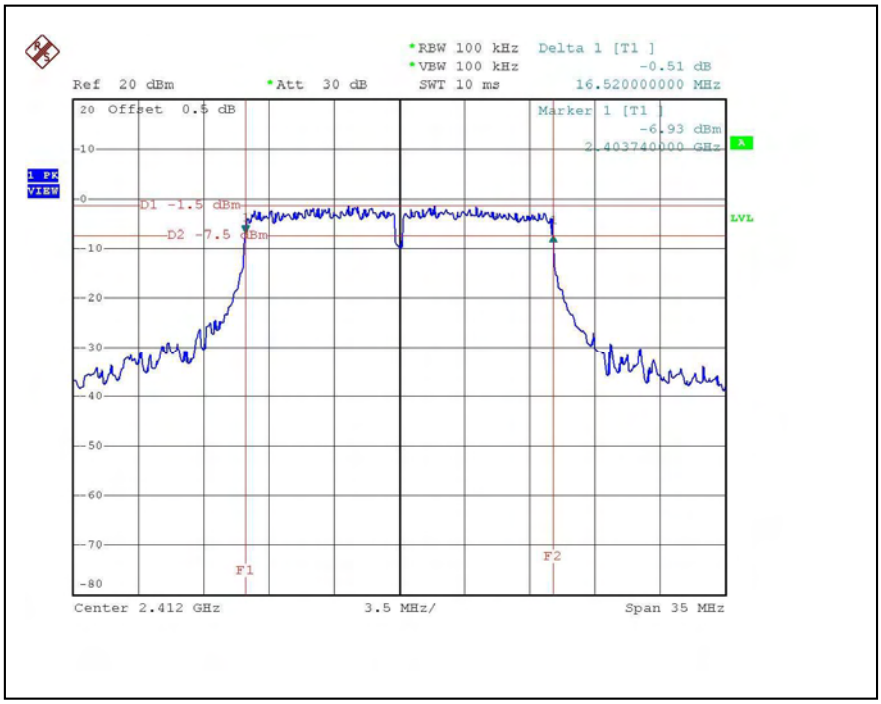

RBW 100 kHz
VBW 100 kHz
SWT 10 ms
Delta 1 [T1]
-0.45 dB
11.130000000 MHz
Ref 20 dBm
Att 30 dB
20 Offset 0.5 dB
Marker 1 [T1]
1.36 dBm
2.456540000 GHz
D1 5.74 dBm
D2 -0.26 dBm
1 PK VIEW
LVL
F1
F2
Center 2.462 GHz
3.5 MHz/
Span 35 MHz

802.11g OFDM modulation

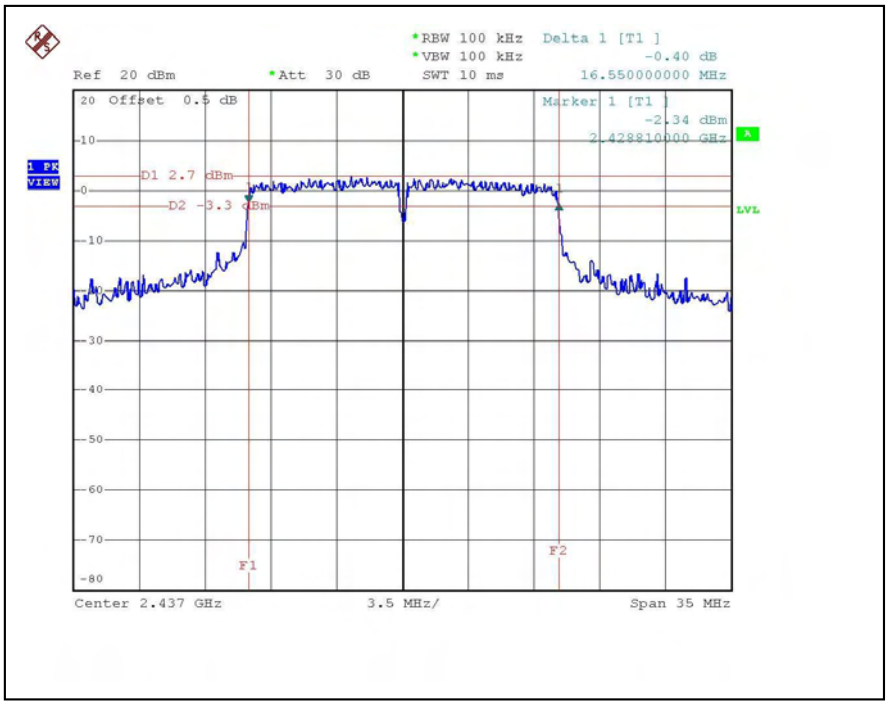
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 62%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.52	0.5	PASS
6	2437	16.55	0.5	PASS
11	2462	16.52	0.5	PASS

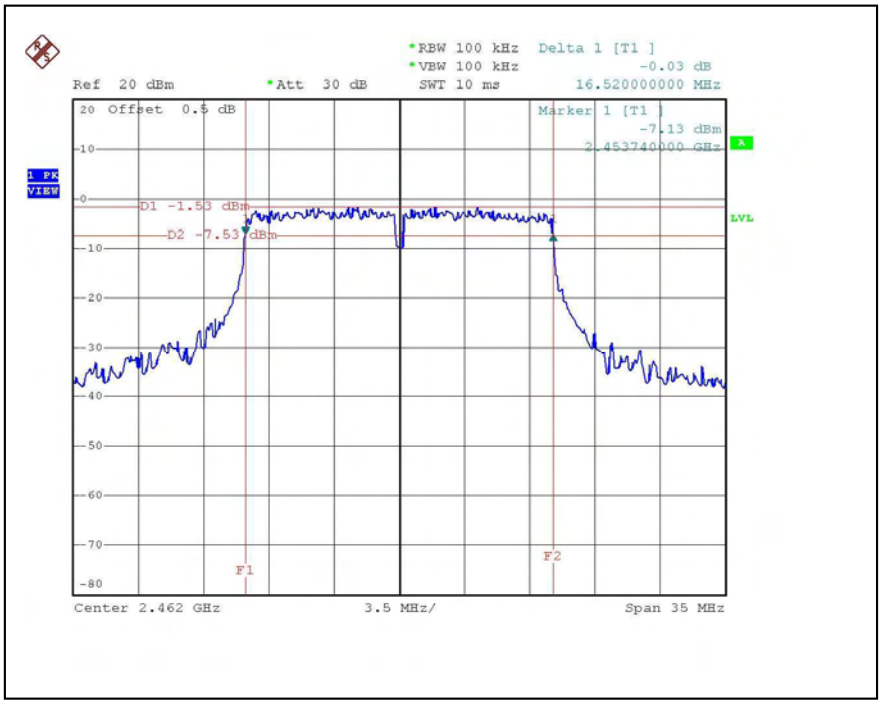
CH1


*RBW 100 kHz
Delta 1 [T1]
*VBW 100 kHz
-0.51 dB
Ref 20 dBm
*Att 30 dB
SWT 10 ms
16.520000000 MHz
20 Offset 0.5 dB
Marker 1 [T1]
-6.93 dBm
2.403740000 GHz
1 PK VIEW
D1 -1.5 dBm
D2 -7.5 dBm
LVL
F1
F2
Center 2.412 GHz
3.5 MHz/
Span 35 MHz

CH6


*RBW 100 kHz
Delta 1 [T1]
*VBW 100 kHz
-0.40 dB
Ref 20 dBm
*Att 30 dB
SWT 10 ms
16.550000000 MHz
20 Offset 0.5 dB
Marker 1 [T1]
-2.34 dBm
2.428810000 GHz
1 PK VIEW
D1 2.7 dBm
D2 -3.3 dBm
LVL
F1
F2
Center 2.437 GHz
3.5 MHz/
Span 35 MHz

CH11


RBW 100 kHz
VBW 100 kHz
SWT 10 ms
Delta 1 [T1]
-0.03 dB
16.520000000 MHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
Marker 1 [T1]
-7.13 dBm
2.453740000 GHz
1 PK
VIEW
D1 -1.53 dBm
D2 -7.53 dBm
LVL
F1
F2
Center 2.462 GHz
3.5 MHz/
Span 35 MHz

4.4 MAXIMUM PEAK OUTPUT POWER

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2007
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	Jul. 04, 2008
NARDA DETECTOR	4503A	FSCM99899	NA

NOTE:
The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

802.11b DSSS modulation

MODULATION TYPE	CCK	**TRANSFER RATE**	1Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 62%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	60.256	17.80	30	PASS
2	2417	64.565	18.10	30	PASS
3	2422	87.096	19.40	30	PASS
6	2437	79.433	19.00	30	PASS
9	2452	91.201	19.60	30	PASS
10	2457	66.069	18.20	30	PASS
11	2462	63.096	18.00	30	PASS

802.11g OFDM modulation

MODULATION TYPE	BPSK	TRANSFER RATE	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	ENVIRONMENTAL CONDITIONS	25deg. C, 62%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	45.709	16.60	30	PASS
2	2417	58.884	17.70	30	PASS
3	2422	77.625	18.90	30	PASS
4	2427	91.201	19.60	30	PASS
6	2437	100.000	20.00	30	PASS
8	2447	93.325	19.70	30	PASS
9	2452	74.131	18.70	30	PASS
10	2457	56.234	17.50	30	PASS
11	2462	42.658	16.30	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

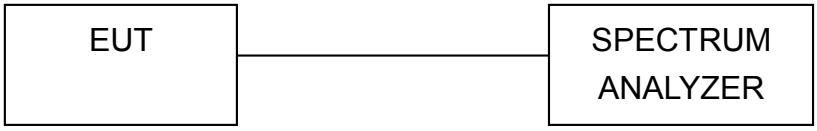
4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded.
The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

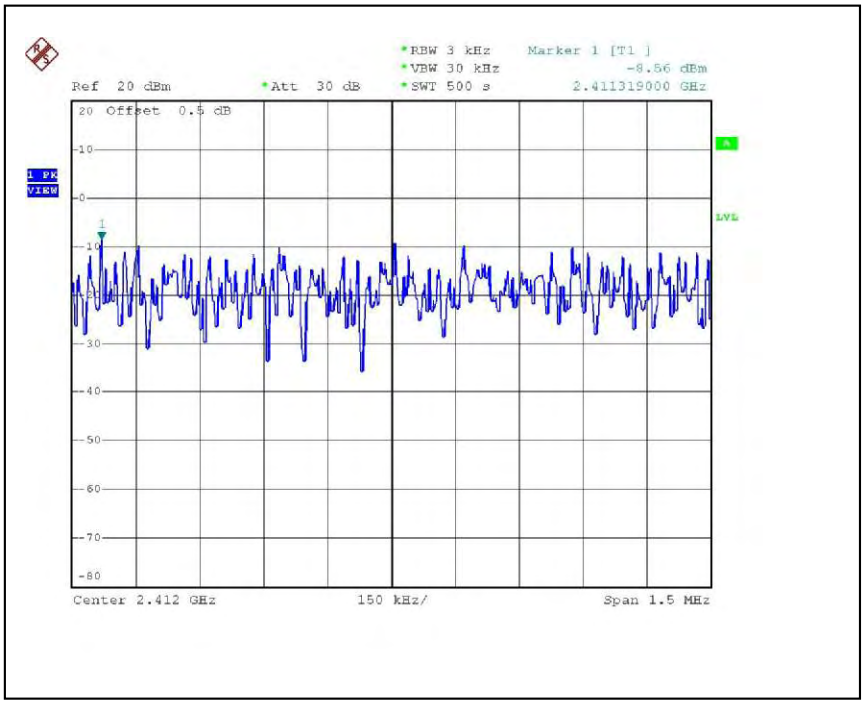
4.5.7 TEST RESULTS

802.11b DSSS modulation

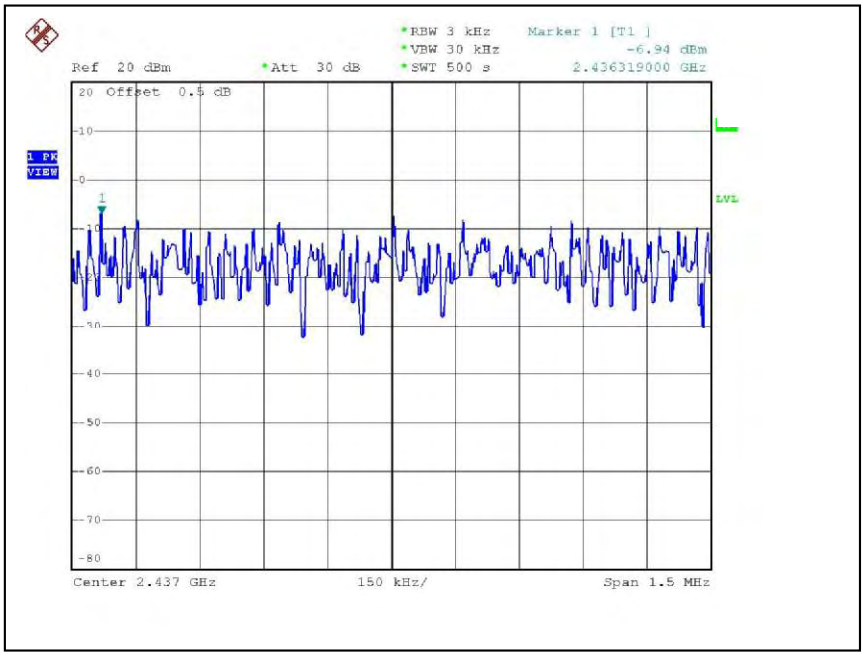
MODULATION TYPE	CCK	**TRANSFER RATE**	11Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 62%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-8.56	8	PASS
6	2437	-6.94	8	PASS
11	2462	-8.20	8	PASS

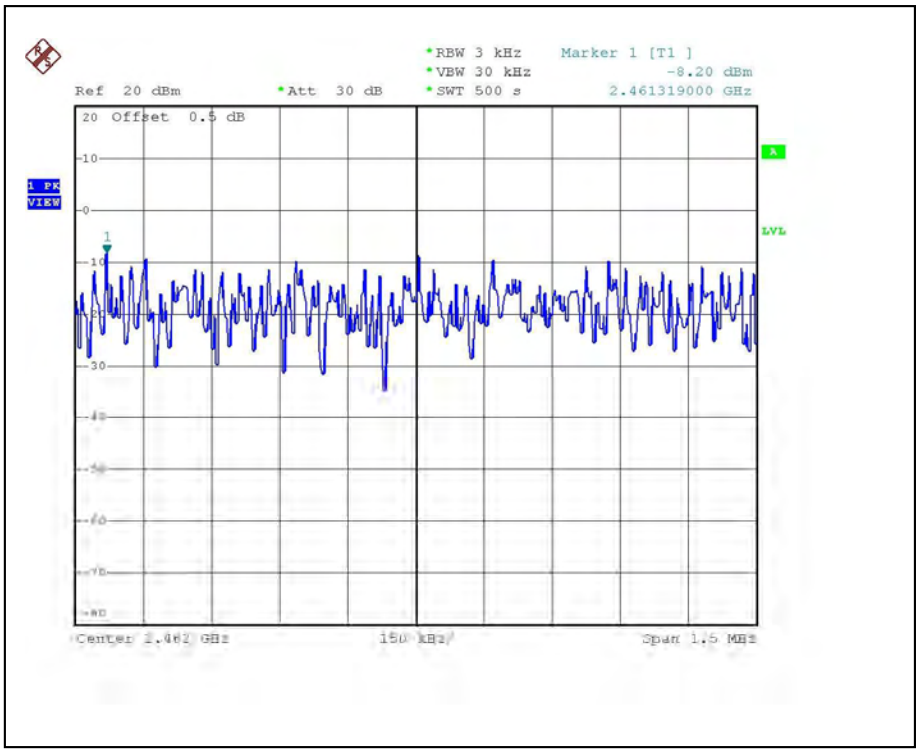
CH1


RBW 3 kHz
VBW 30 kHz
SWT 500 s
Marker 1 [T1]
-8.56 dBm
2.411319000 GHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
1 PK
VIEW
LVL
Center 2.412 GHz
150 kHz/
Span 1.5 MHz

CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
Marker 1 [T1]
-6.94 dBm
2.436319000 GHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
1 PK
VIEW
LVL
Center 2.437 GHz
150 kHz/
Span 1.5 MHz

CH11

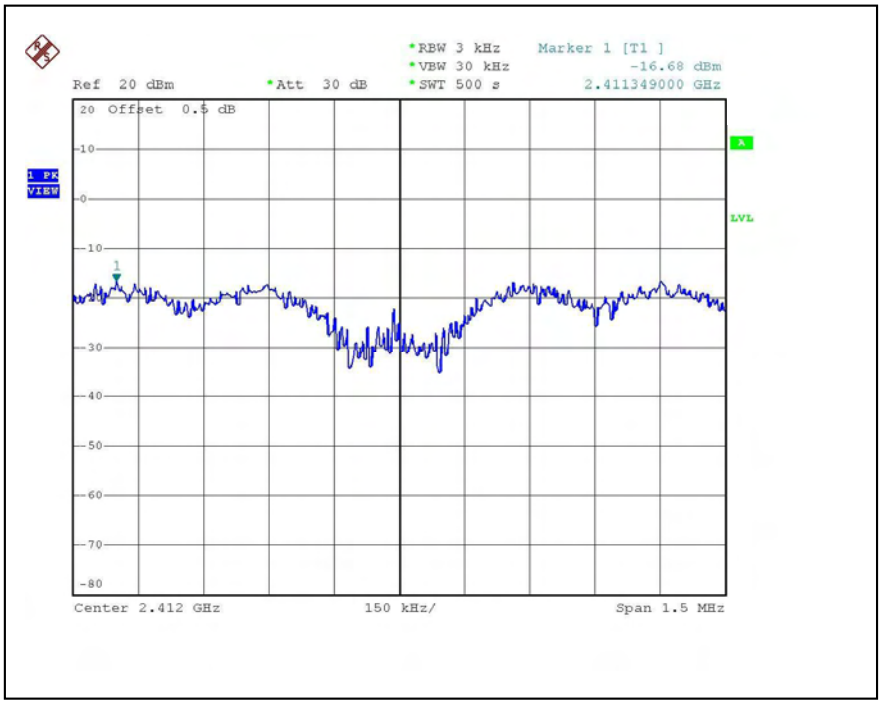

RBW 3 kHz
VBW 30 kHz
SWT 500 s
Marker 1 [T1]
-8.20 dBm
2.461319000 GHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
1 PK
VIEW
A
LVL
Center 2.462 GHz
150 kHz/
Span 1.5 MHz

802.11g OFDM modulation

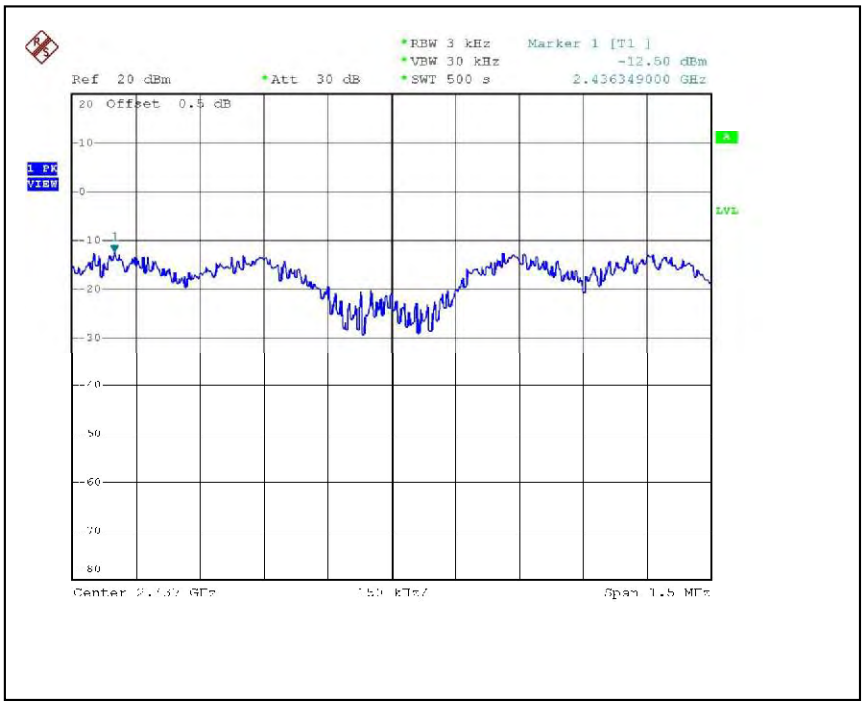
MODULATION TYPE	BPSK	**TRANSFER RATE**	6Mbps
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**ENVIRONMENTAL CONDITIONS**	25deg. C, 62%RH, 960hPa
TESTED BY	Rex Huang		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-16.68	8	PASS
6	2437	-12.50	8	PASS
11	2462	-16.57	8	PASS

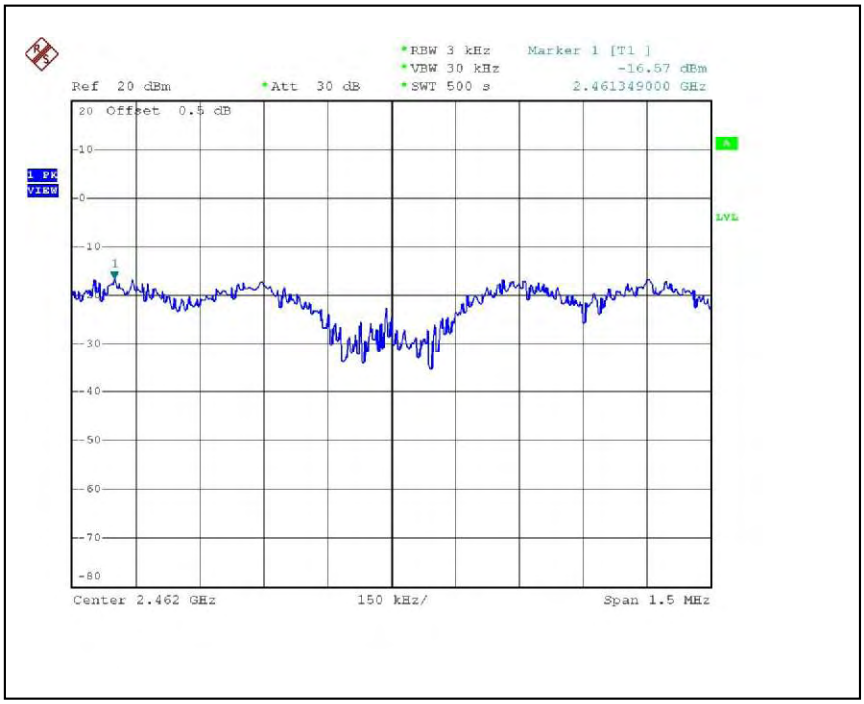
CH1


RBW 3 kHz
VBW 30 kHz
SWT 500 s
Marker 1 [T1]
-16.68 dBm
2.411349000 GHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
1 PK
VIEW
LVL
Center 2.412 GHz
150 kHz/
Span 1.5 MHz

CH6


RBW 3 kHz
VBW 30 kHz
SWT 500 s
Marker 1 [T1]
-12.50 dBm
2.436349000 GHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
1 PK
VIEW
LVL

CH11


RBW 3 kHz
VBW 30 kHz
SWT 500 s
Marker 1 [T1]
-16.57 dBm
2.461349000 GHz
Ref 20 dBm
Att 30 dB
Offset 0.5 dB
1 PK
VIEW
LVL
Center 2.462 GHz
150 kHz/
Span 1.5 MHz

4.6 BAND EDGES MEASUREMENT

4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100037	Aug. 15, 2007

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (RBW = VBW = 100kHz) are attached on the following pages.

4.6.4 EUT OPERATING CONDITION

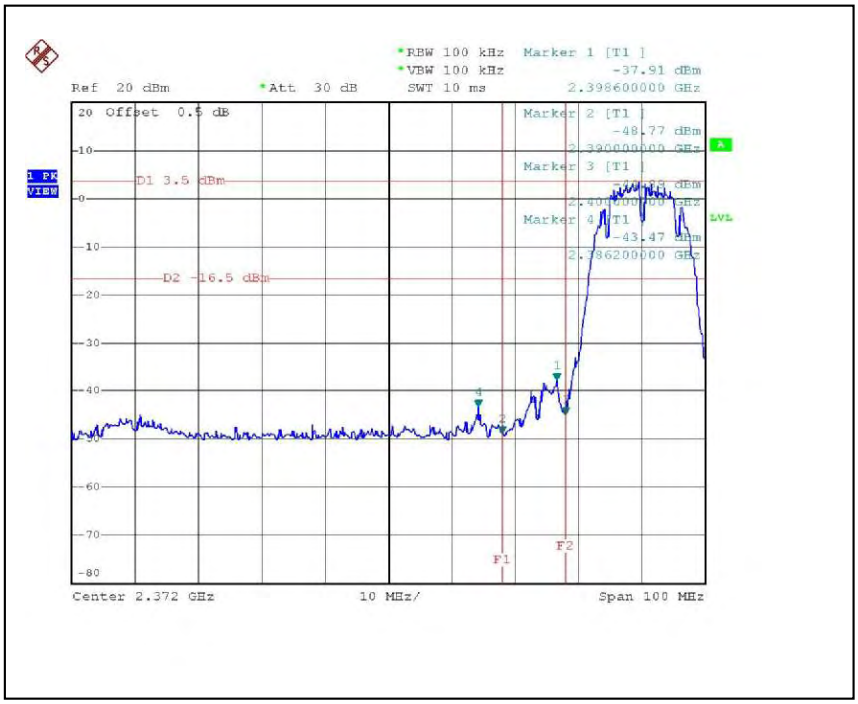
Same as Item 4.3.6

4.6.5 TEST RESULTS

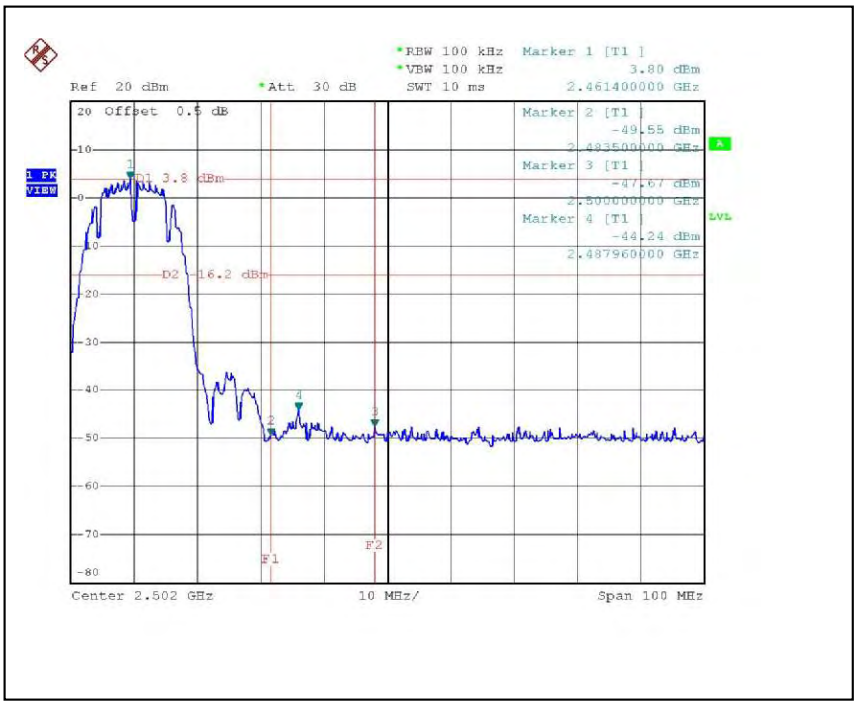
The spectrum plots are attached on the following 4 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

802.11b DSSS modulation:

CH1

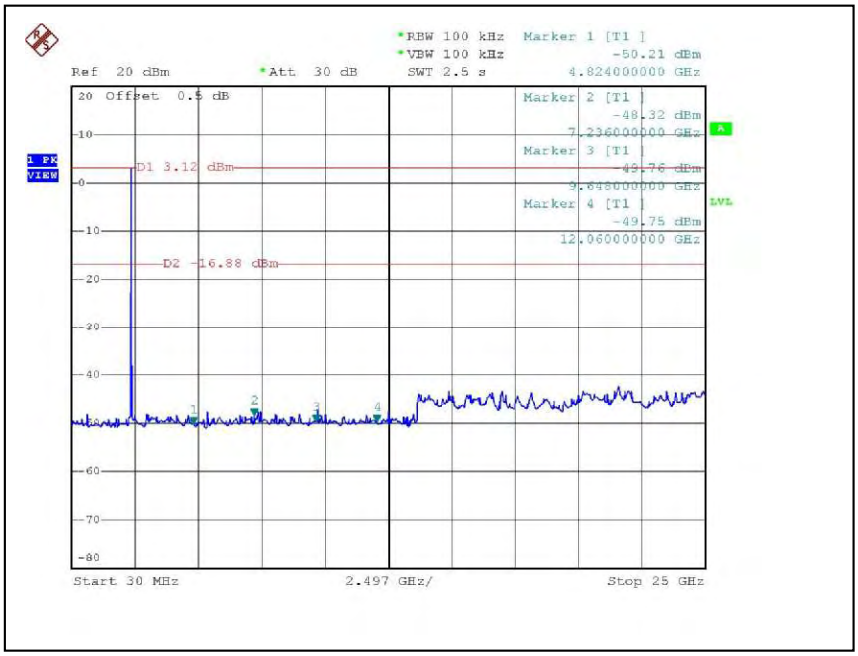


CH11

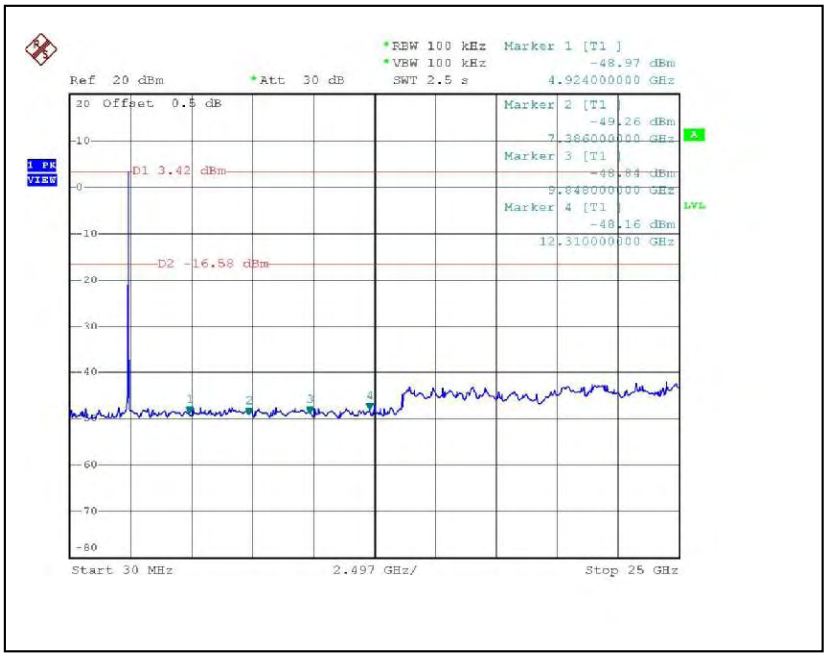


802.11b 10th conducted Harmonic

CH1

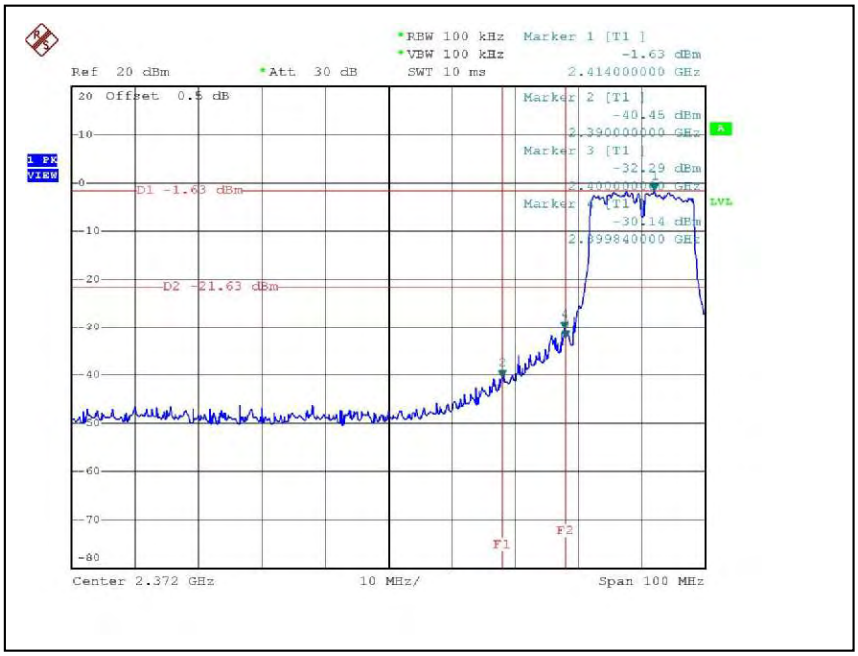


CH11

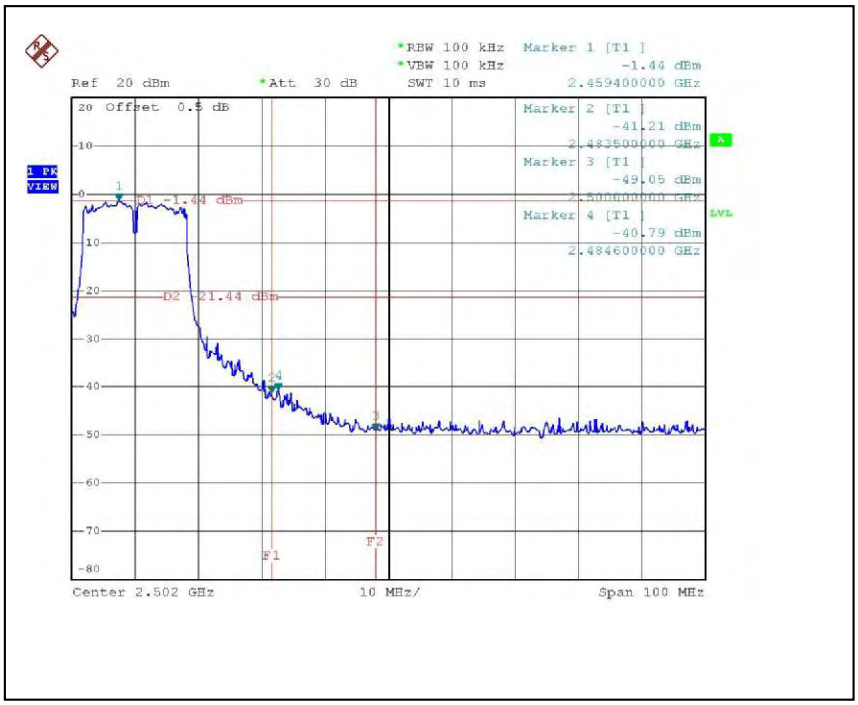


802.11g OFDM modulation:

CH1

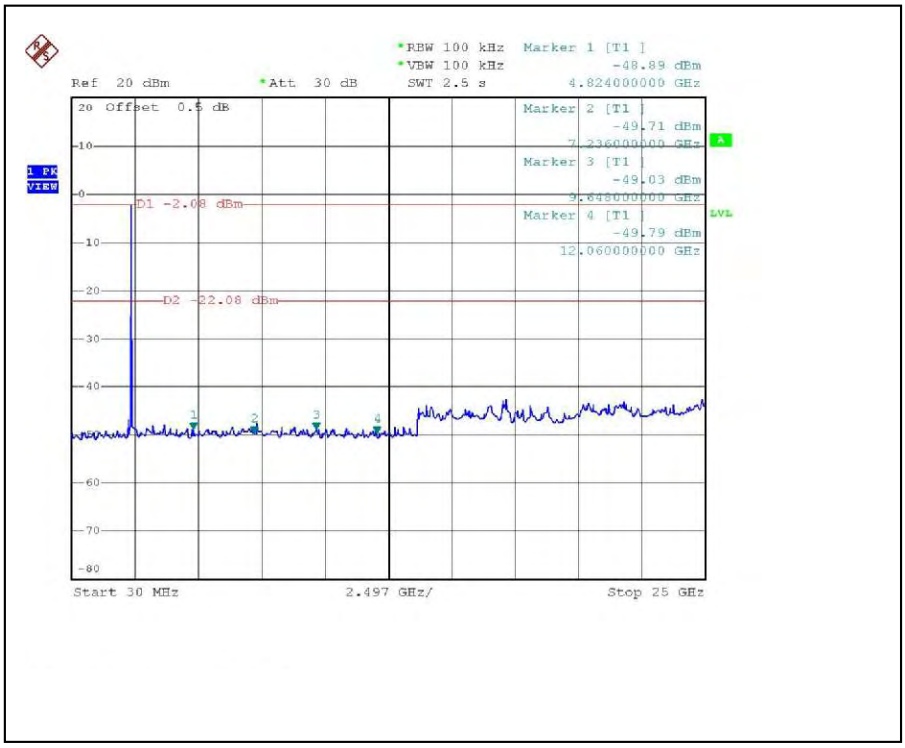


CH11

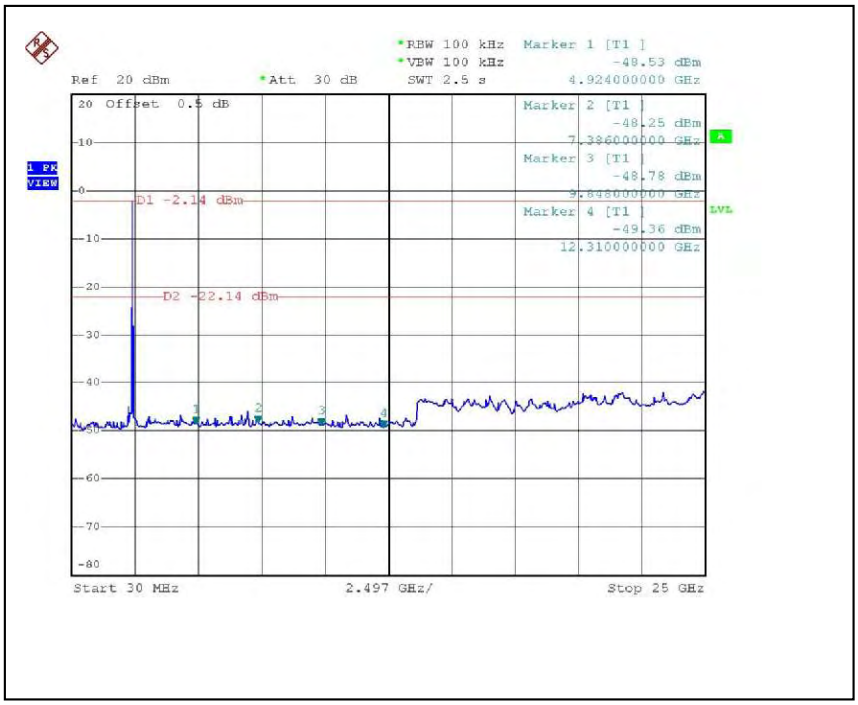


802.11g 10th conducted Harmonic

CH1



CH11



4.7 ANTENNA REQUIREMENT

4.7.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.7.2 ANTENNA CONNECTED CONSTRUCTION

There are two antennas provided to this EUT, please refer to the following table:

Model No.	Gain (dBi)	Antenna Type	Antenna Connector	Condition (*)	Net gain (dBi)
Printronics-HG2403RD-RSF	**3**	**Dipole**	**R-SMA**	Condition 1: 1dB	Condition 1: 2
				Condition 2: 0.9dB	**Condition 2: 2.1**

*There will have two conditions for this antenna:
Condition 1: RF Cable(10mm)+PCB trace(10mm) / Cable loss:HG2403RD-RSF Short cable(Include PCB Trace):1dB
Condition 2: RF Cable(268mm)/ cable loss:HG2403RD-RSF Long cable: 0.9dB

Model No.	Frequency	Gain (dBi)	Antenna Type	Antenna Connector	Cable loss	Net gain (dBi)
ML-2452-APA2-01	2.4GHz	3	Dipole	R-SMA	0.9dB	2.1

Above antennas the indicated in bold type was chosen for final test.

5. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	TAF, BSMI, NCC
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also

6.APPENDIX-A MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.