TEST REPORT

of

FCC Part 15 Subpart C §15.247 / RSS-210 Issue 8, RSS-Gen Issue 3

FCC ID/IC Certification: TUIWIT400HE / 6241A-WIT400HE

Equipment Under Test	:	Wireless IP Terminal
Model Name	:	WIT-400HE
Serial No.	:	N/A
Applicant	:	Ericsson-LG Co., Ltd.
Manufacturer	:	Ericsson-LG Co., Ltd.
Date of Test(s)	:	2012.09.19 ~ 2012.09.27
Date of Issue	:	2012.12.18

In the configuration tested, the EUT complied with the standards specified above.

Tested By: Logan Lee **Date** 2012.12.18

Approved By: Feel Jeong **Date** 2012.12.18

INDEX

Table of contents

1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- 400-2, Gomae-dong, Giheoung-gu, Yongin-si, Gyeonggi-do, Korea, 446-901
- Wireless Div. 3FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx.

Telephone : +82 31 428 5700
FAX : +82 31 427 2371

1.2. Details of Applicant

Applicant : Ericsson-LG Co., Ltd.
Address : (Yeoksam-dong, GS Tower 7,8th Floor), 508, Nonhyeon-ro, Gangnam-gu Seoul 135-985 Korea, Republic of
Contact Person : Kang, Sang-Jin
Phone No. : +82 31 8054 6017

1.3. Description of EUT

Kind of Product	Wireless IP Terminal
Model Name	WIT-400HE
Serial Number	N/A
Power Supply	DC 3.7 V
Frequency Range	2 412 ㎒ ~ 2 462 ㎒ (11b/g)
Modulation Technique	DSSS, OFDM
Number of Channels	11 channel (11b/g)
Antenna Type	Internal type(Chip)
Antenna Gain	2 412 ㎒ ~ 2 462 ㎒: -0.35 ㏈i

1.4. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Signal Generator	R&S	SMR40	100540	Jan, 05, 2012	Annual	Jan, 05, 2013
Spectrum Analyzer	R&S	FSV30	101004	Jul. 05, 2012	Annual	Jul. 05, 2013
Attenuator	Mini-Circuits	BW-N20W5+	0950-4	Mar. 30, 2012	Annual	Mar. 30, 2013
High Pass Filter	Wainwright	WHK3.0/18G-6SS	4	Aug. 01, 2012	Annual	Aug. 01, 2013
Low Pass Filter	Mini circuits	NLP-1200+	V9500401023-1	Aug. 01, 2012	Annual	Aug. 01, 2013
Power Sensor	R & S	NRP-Z81	101341	Jul. 31. 2012	Annual	Jul. 31. 2013
DC Power Supply	Agilent	U8002A	MY50020026	Mar. 29, 2012	Annual	Mar. 29, 2013
Preamplifier	R & S	8447D	2727A05143	Jul. 18. 2012	Annual	Jul. 18. 2013
Preamplifier	R & S	SCU 18	10117	Jan. 02, 2012	Annual	Jan. 02, 2013
Preamplifier	MITEQ Inc.	JS44-18004000-35-8P	1546891	Jul. 12, 2012	Annual	Jul. 12, 2013
Test Receiver	R & S	ESU40	100075	Feb. 13, 2012	Annual	Feb. 13, 2013
Trilog Antenna	SCHWARZBECK	VULB9163	9163-390	Apr. 19, 2012	Biennial	Apr. 19, 2014
Horn Antenna	R&S	HF907	100208	Aug. 13, 2012	Biennial	Aug. 13, 2014
Horn Antenna	SCHWARZBECK MESSELEKTRONIK	BBHA9170	BBHA9170431	May 15, 2012	Biennial	May 15, 2014
Antenna Master	INN-CO	MA4000-EP	N/A	N.C.R.	N.C.R.	N.C.R.
Turn Table	INN-CO	DT-3000S	N/A	N.C.R.	N.C.R.	N.C.R.
Anechoic Chamber	SY Corporation	L × W × H (21.5 m × 13.0 m × 9.0 m)	N/A	N.C.R.	N.C.R.	N.C.R.
EMI Test Receiver	R & S	ESCI7	100778	Aug. 01, 2012	Annual	Aug. 01, 2013
Two-Line V-Network	R & S	ENV216	101180	May 14, 2012	Annual	May 14, 2013

▶ Support equipment

Description	Manufacturer	Model	Serial Number
N/A	-	-	-

1.5. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD:FCC Part15 subpart B&C, RSS-210, RSS-Gen			
Standard section		**Test Item**	**Result**
15.205(a) 15.209 15.247(d)	A8.5	Transmitter Radiated Spurious Emissions Conducted Spurious Emission	Complied
15.109(a)	RSS-Gen 6	Receiver Radiated Spurious Emission	Complied
15.247(a)(2)	A8.2(a)	6 dB Bandwidth and 99% BW	Complied
15.247(b)(3)	A8.4(4)	Maximum Peak Output Power	Complied
15.247(e)	A8.3(2)	Power Spectral Density	Complied
15.207	RSS-Gen 5.5/ RSS-102	Transmitter AC power line conducted emission	Complied

1.6. Test Procedure(s)

The measurement procedures described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 ㎑ to 40 ㎓ (ANSI C63.4-2003) and the guidance provided in KDB 558074 were used in the measurement of the DUT.

1.7. Sample calculation

Where relevant, the following sample calculation is provided:

1.7.1. Conducted test

Offset value (㏈) = Attenuator (㏈) + Cable loss (㏈)

1.7.2. Radiation test

Field strength level (㏈㎶/m) = Measured level (㏈㎶) + Antenna factor (㏈) + Cable loss (㏈) - amplifier gain(㏈)

1.8. Test report revision

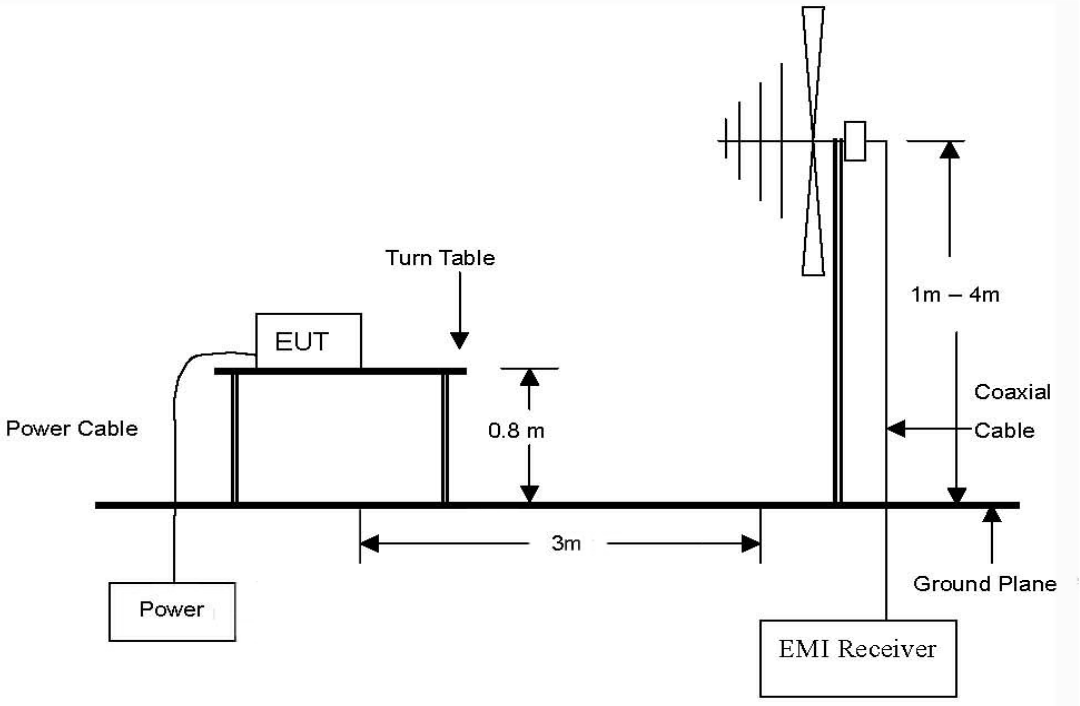
Revision	Report number	Description
0	F690501/RF-RTL005841	Initial
1	F690501/RF-RTL005841-1	Revision FCC ID
2	F690501/RF-RTL005841-2	Revision Applicant address

2. Transmitter Radiated Spurious Emissions and Conducted Spurious Emission

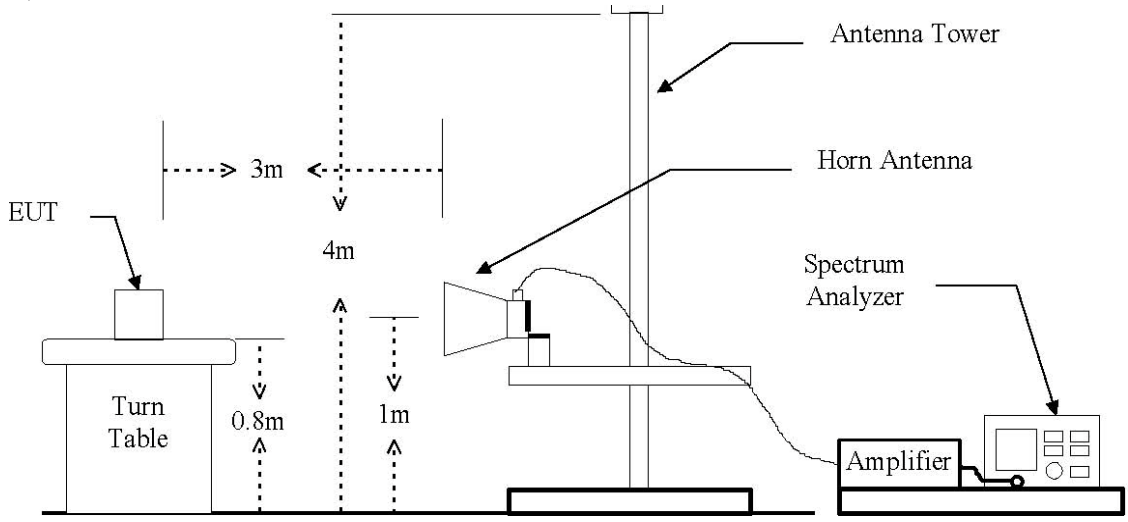
2.1. Test Setup

2.1.1. Transmitter Radiated Spurious Emissions

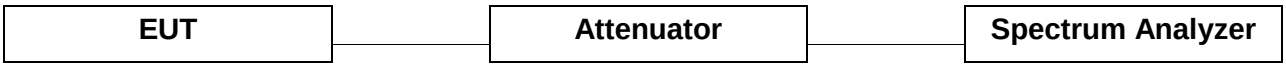
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission .The spurious emissions were investigated form 1 ㎓ to the 10th harmonic of the highest fundamental frequency or 40 ㎓, whichever is lower.



2.1.2. Conducted Spurious Emission



2.2. Limit

According to §15.247(d), in any 100 ㎑ bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 ㏈ below that in the 100 ㎑ bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement , provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval , as permitted under paragraph(b)(3) of this section , the attenuation required under this paragraph shall be 30 ㏈ instead of 20 ㏈. Attenuation below the general limits specified in section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))

According to § 15.209(a), Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table：

Frequency (㎒)	Distance (Meters)	Field Strength (㏈㎶/m)	Field Strength (㎶/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates in section 5.4 of KDB 558074

2.3.1. Test Procedures for Radiated Spurious Emissions

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 ㎓, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 ㎓, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 ㏈ lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 ㏈ margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE ;

All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

1. The measurements for below 1 ㎓
Set the RBW = 100 - 120 ㎑ and VBW ≥ 3 x RBW of test receiver/spectrum analyzer for Peak detection (PK) or Quasi-peak detection (QP)

2. The measurements for above 1 ㎓
Average measurements are recorded using the RBAVG1 measurement procedure of KDB 558074.
Peak measurements are recorded using RBW = 1 ㎒, VBW = 3 ㎒

3. To get a maximum emission level from the EUT, the EUT is manipulated through three orthogonal planes. (symbol period: 11b/g = 4 ㎲, 11n_HT20, 40 = 3.6 ㎲)

2.3.2. Test Procedures for Conducted Spurious Emissions

All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

Per the guidance of KDB 558074, section 5.4.1.1, the reference level for out of band emissions is established from the plots of this section since the band edge emissions are measured with a RBW of 100 ㎑. This reference level is then used as the limit in subsequent plots for out of band spurious emissions shown in section 2.4.3. The limit for out of band spurious emission at the band edge is 30 ㏈ below the fundamental emission level measured in a 100 ㎑ bandwidth.

2.4. Test Results

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

2.4.1. Radiated Spurious Emission (Worst case configuration_11g mode, 6 Mbps)

The frequency spectrum from 30 ㎒ to 1 000 ㎒ was investigated. All reading values are Quasi-Peak values.

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
96.01	21.20	Quasi-Peak	H	12.66	-23.85	10.01	43.50	33.49
159.99	40.80	Quasi-Peak	H	8.67	-23.12	26.35	43.50	17.15
560.00	43.66	Quasi-Peak	H	17.70	-22.58	38.78	46.00	7.22
880.01	36.99	Quasi-Peak	H	20.88	-21.02	36.85	46.00	9.15
960.01	37.40	Quasi-Peak	H	21.48	-20.60	38.28	54.00	15.72
Above 1 000.00	Not detected	-	-	-	-	-	-	-

Remark:

1. All spurious emission at channels are almost the same below 1 ㎓, so that the middle channel was chosen at representative in final test.
2. Actual = Reading + AF + AMP + CL

2.4.2. Spurious Radiated Emission

The frequency spectrum above 1 000 ㎒ was investigated.

DSSS : 802.11b(1 Mbps)
Low Channel (2 412 ㎒)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*2 390.00	13.85	Peak	H	29.34	8.87	52.06	74.00	21.94
*2 390.00	4.82	Average	H	29.34	8.87	43.03	54.00	10.97

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 824.09	39.73	Peak	H	34.07	-30.02	43.78	74.00	30.22
*4 824.09	30.67	Average	H	34.07	-30.02	34.72	54.00	19.28
Above 4 900.00	Not detected	-	-	-	-	-	-	-

Middle Channel (2 437 ㎒)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 873.95	40.96	Peak	H	34.14	-30.19	44.91	74.00	29.09
*4 873.95	33.22	Average	H	34.14	-30.19	37.17	54.00	16.83
Above 4 900.00	Not detected	-	-	-	-	-	-	-

High Channel (2 462 ㎒)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*2 483.50	14.10	Peak	H	29.56	9.15	52.81	74.00	21.19
*2 483.50	4.64	Average	H	29.56	9.15	43.35	54.00	10.65

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 923.97	43.90	Peak	H	34.20	-30.35	47.75	74.00	26.25
*4 923.97	39.80	Average	H	34.20	-30.35	43.65	54.00	10.35
Above 5 000.00	Not detected	-	-	-	-	-	-	-

DSSS : 802.11g(6 Mbps)
Low Channel (2 412 ㎒)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*2 390.00	19.17	Peak	H	29.34	8.87	57.38	74.00	16.62
*2 390.00	6.07	Average	H	29.34	8.87	44.28	54.00	9.72

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 823.88	35.77	Peak	H	34.07	-30.02	39.82	74.00	34.18
*4 823.88	26.77	Average	H	34.07	-30.02	30.82	54.00	23.18
Above 4 900.00	Not detected	-	-	-	-	-	-	-

Middle Channel (2 437 ㎒)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 841.35	41.14	Peak	H	34.09	-30.07	45.16	74.00	28.84
*4 841.35	27.64	Average	H	34.09	-30.07	31.66	54.00	22.34
Above 4 900.00	Not detected	-	-	-	-	-	-	-

High Channel (2 462 ㎒)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*2 483.50	25.77	Peak	H	29.56	9.15	64.48	74.00	9.52
*2 483.50	11.91	Average	H	29.56	9.15	50.62	54.00	3.38

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
*4 924.23	43.71	Peak	H	34.20	-30.35	47.56	74.00	26.44
*4 924.23	30.58	Average	H	34.20	-30.35	34.43	54.00	19.57
Above 5 000.00	Not detected	-	-	-	-	-	-	-

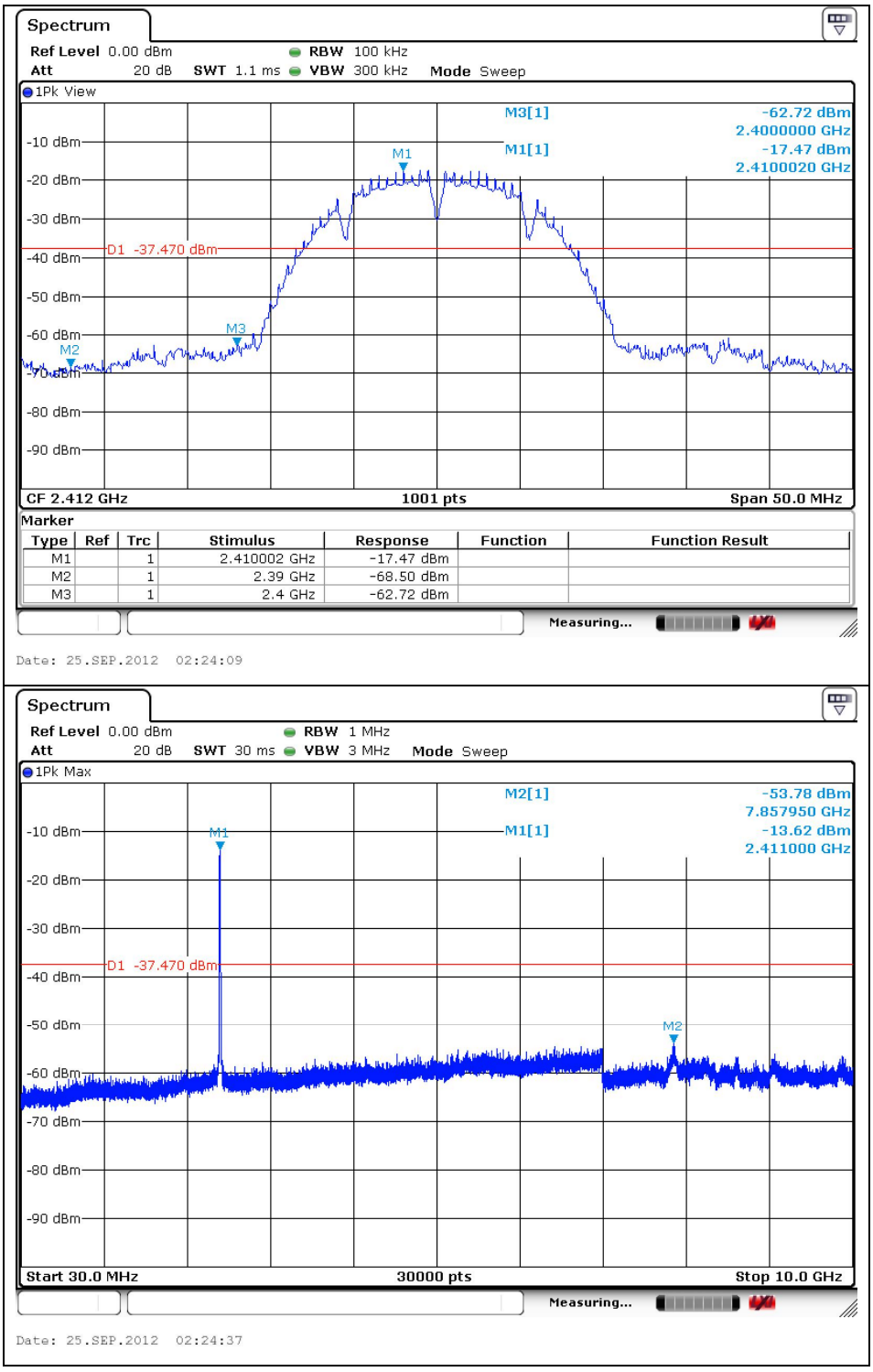
Remarks:

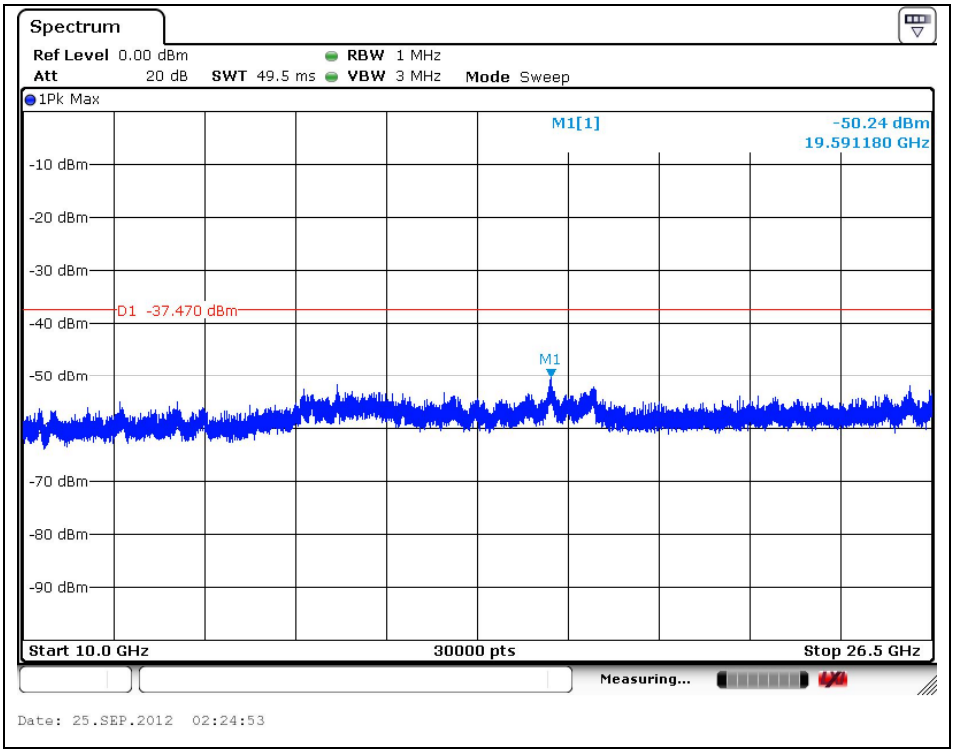
1. "*" means the restricted band.
2. Measuring frequencies from 1 ㎓ to the 10th harmonic of highest fundamental frequency.
3. Radiated emissions measured in frequency above 1 000 ㎒ were made with an instrument using peak/average detector mode.
4. Actual = Reading + AF + AMP + CL

2.4.3. Spurious RF Conducted Emissions: Plot of Spurious RF Conducted Emission

DSSS : 802.11b(1 Mbps)

Low Channel

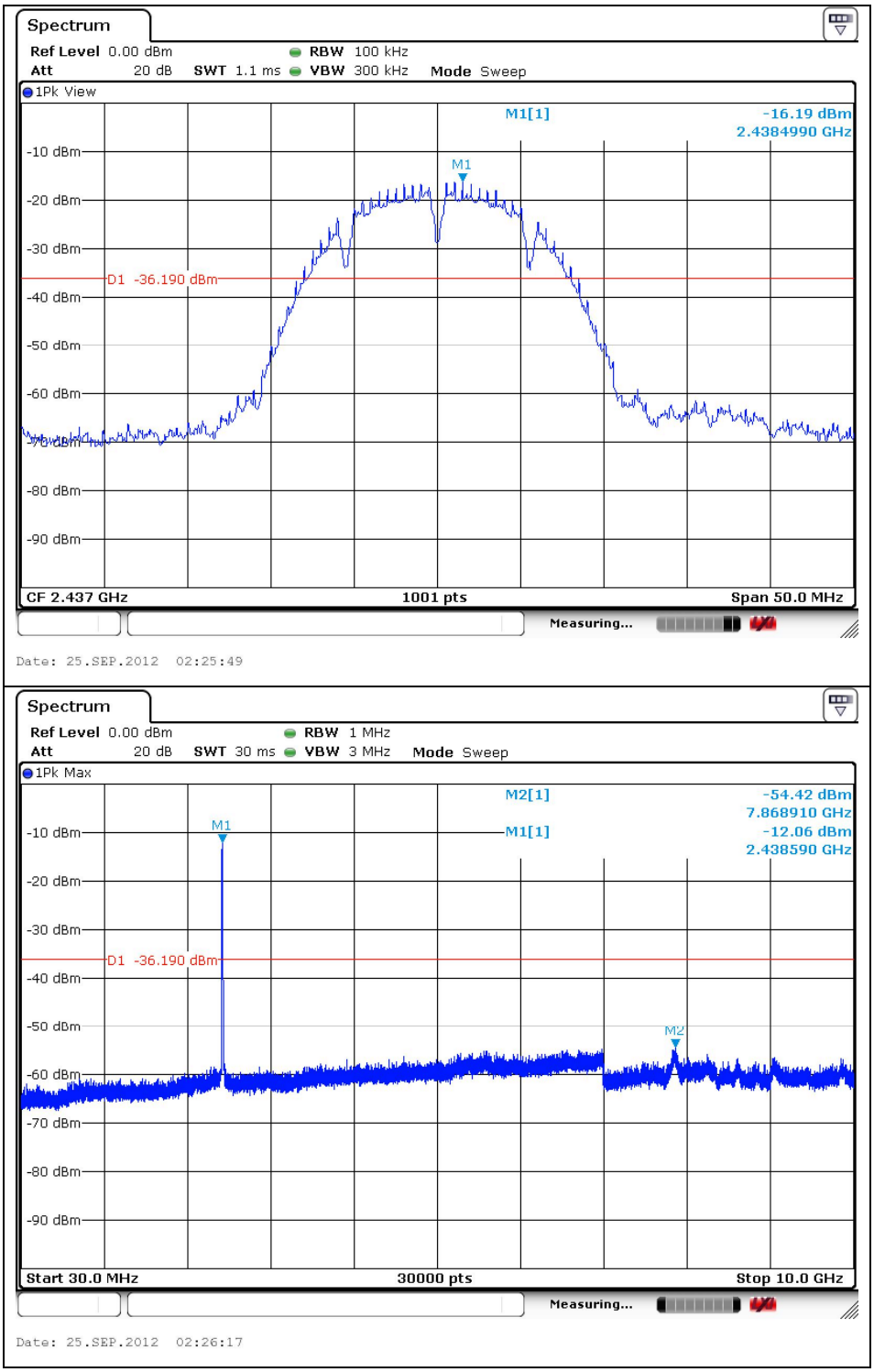


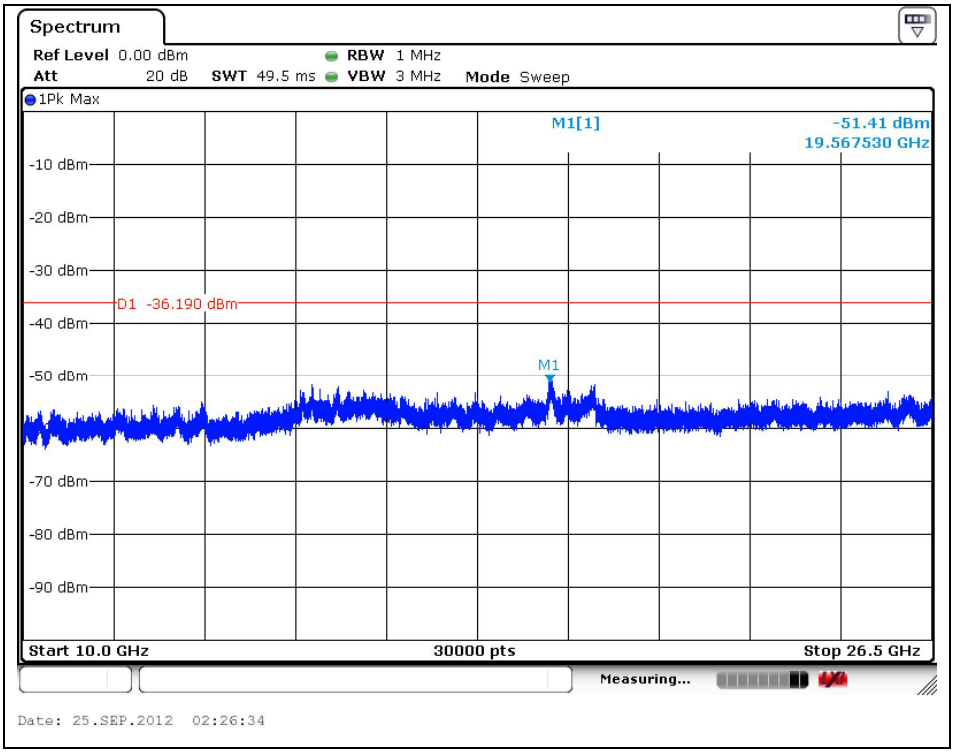


Note:
Offset (dB) = Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
2 390.00	20.84	-68.50	-47.66
2 400.00	20.84	-62.72	-41.88
7 857.95	23.41	-53.78	-30.37
19 591.18	-	Noise floor	-

Middle Channel

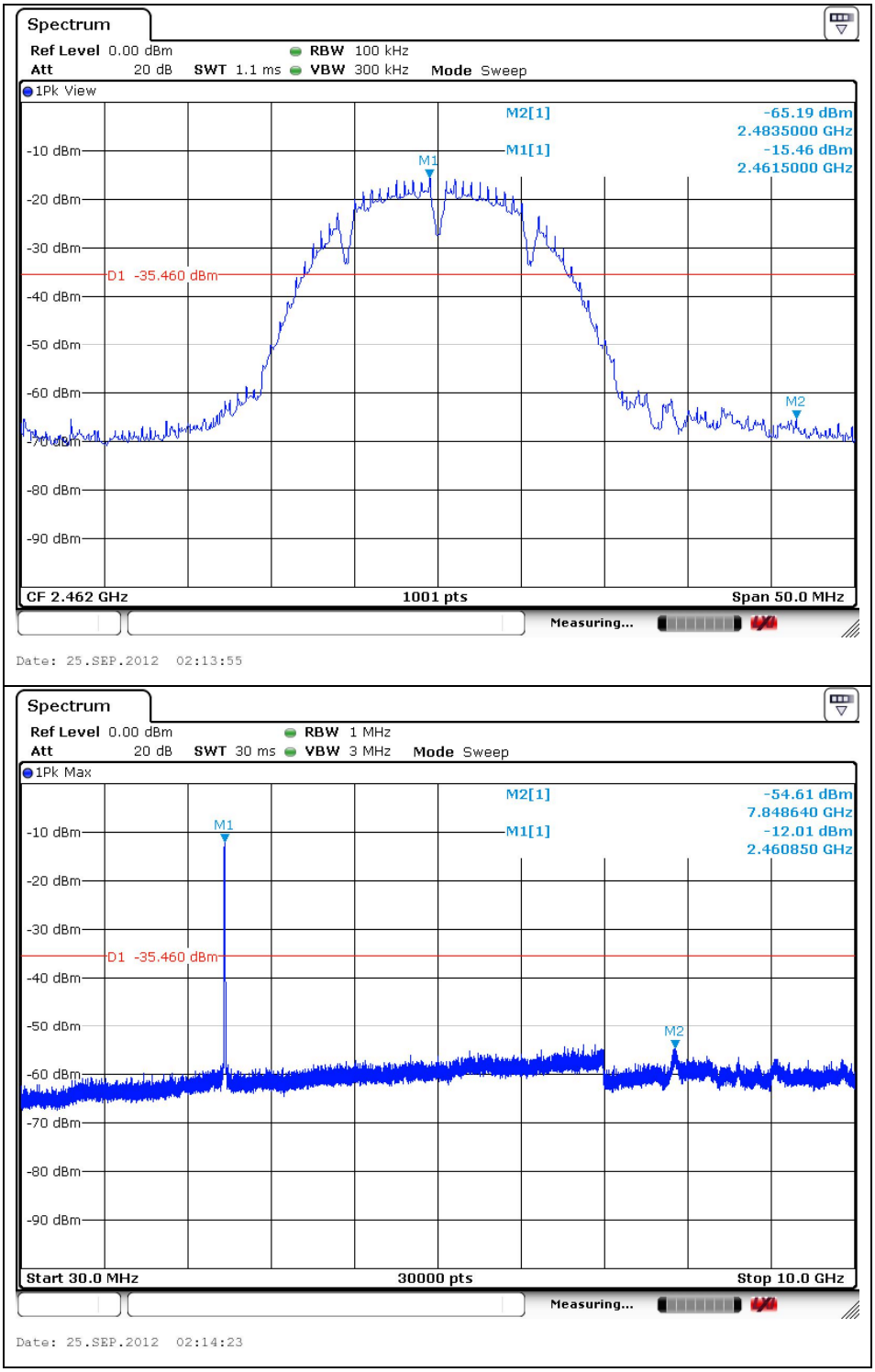


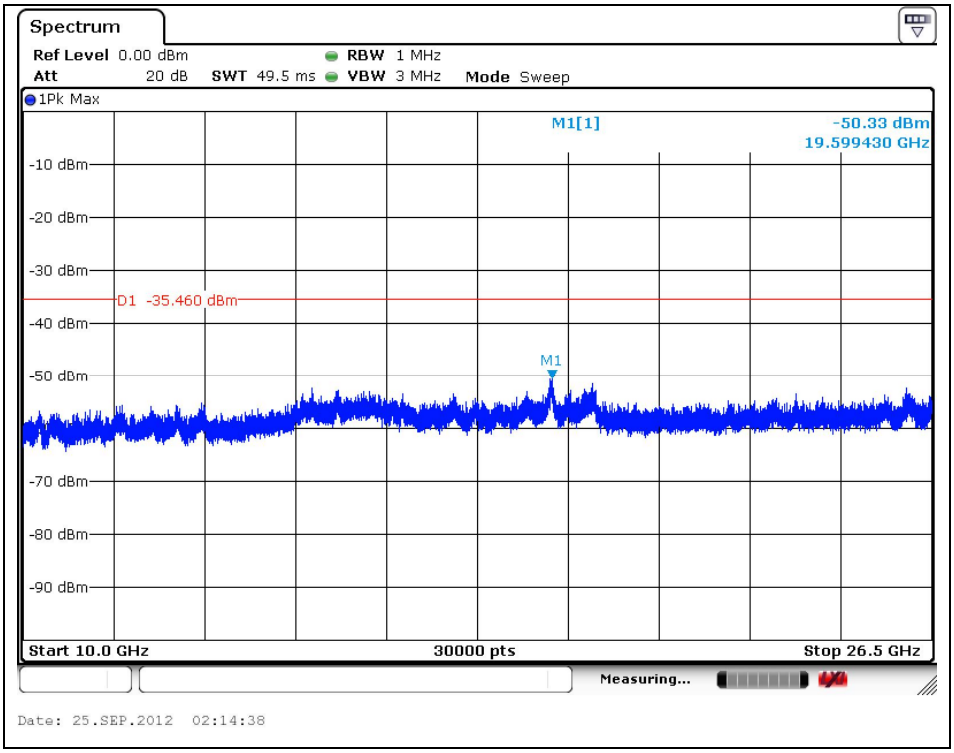


Note:
Offset (dB) = Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
7 868.91	23.45	-54.42	-30.97
19 567.53	-	Noise floor	-

High Channel



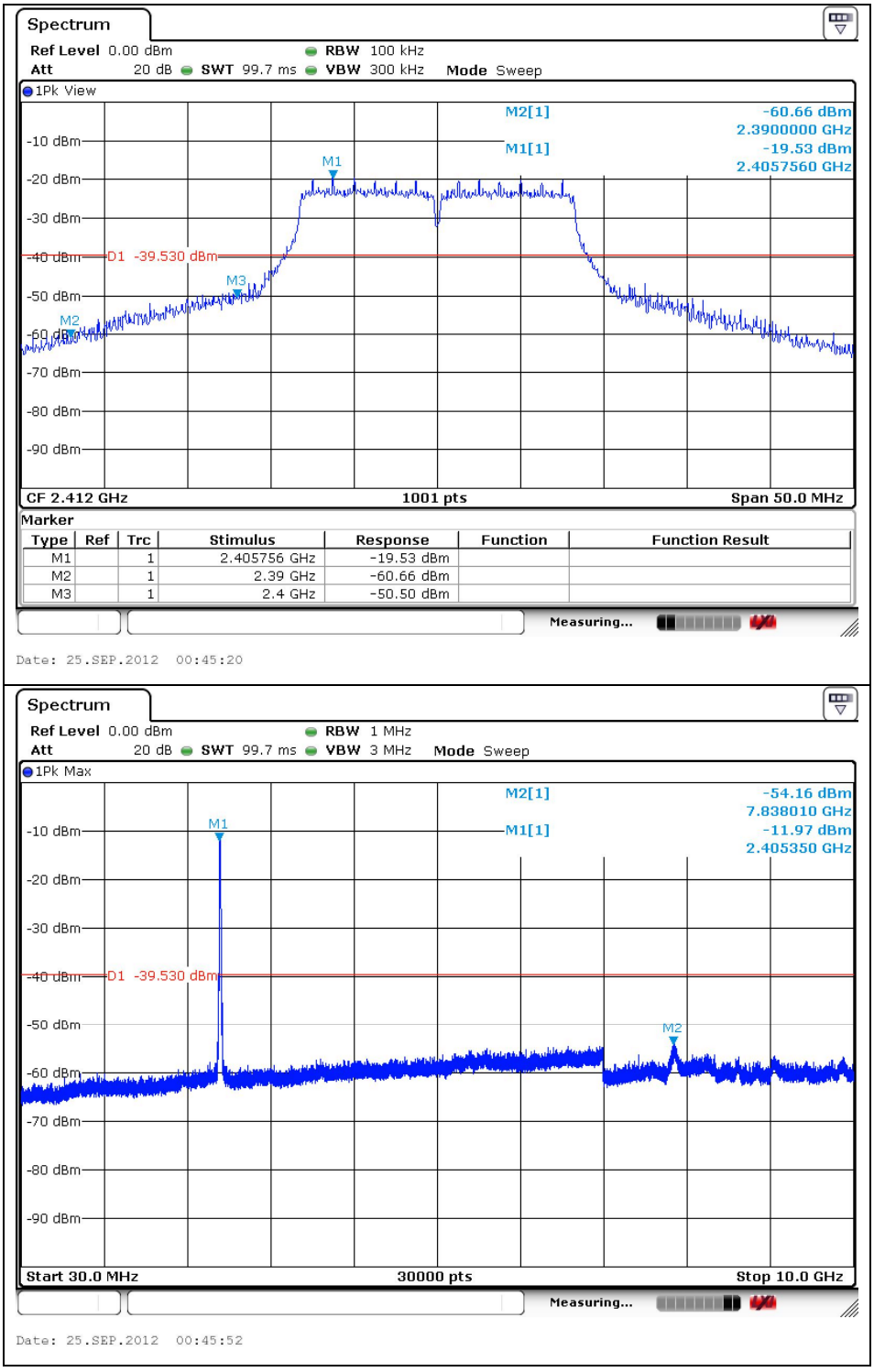


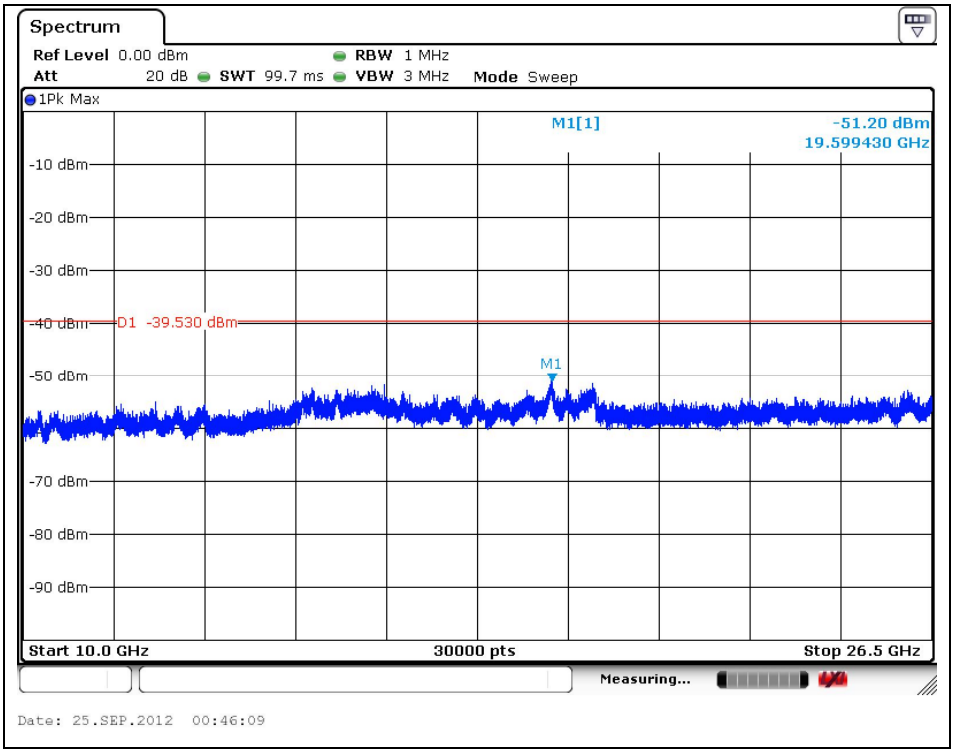
Note:
Offset (dB) = Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
2 483.50	20.87	-65.19	-44.32
7 848.64	23.45	-54.61	-31.16
19 599.43	-	Noise floor	-

OFDM : 802.11g(6 Mbps)

Low Channel

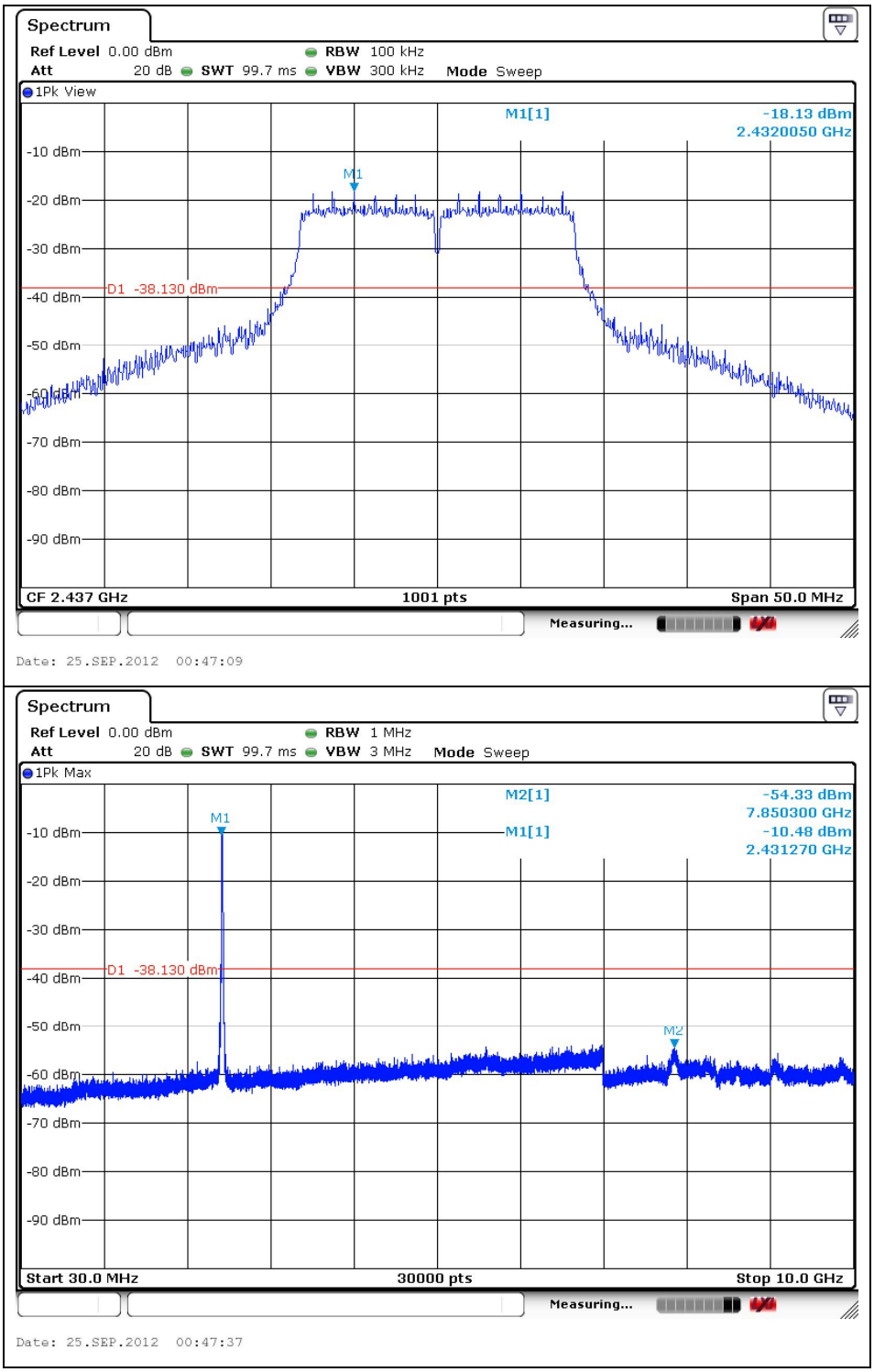


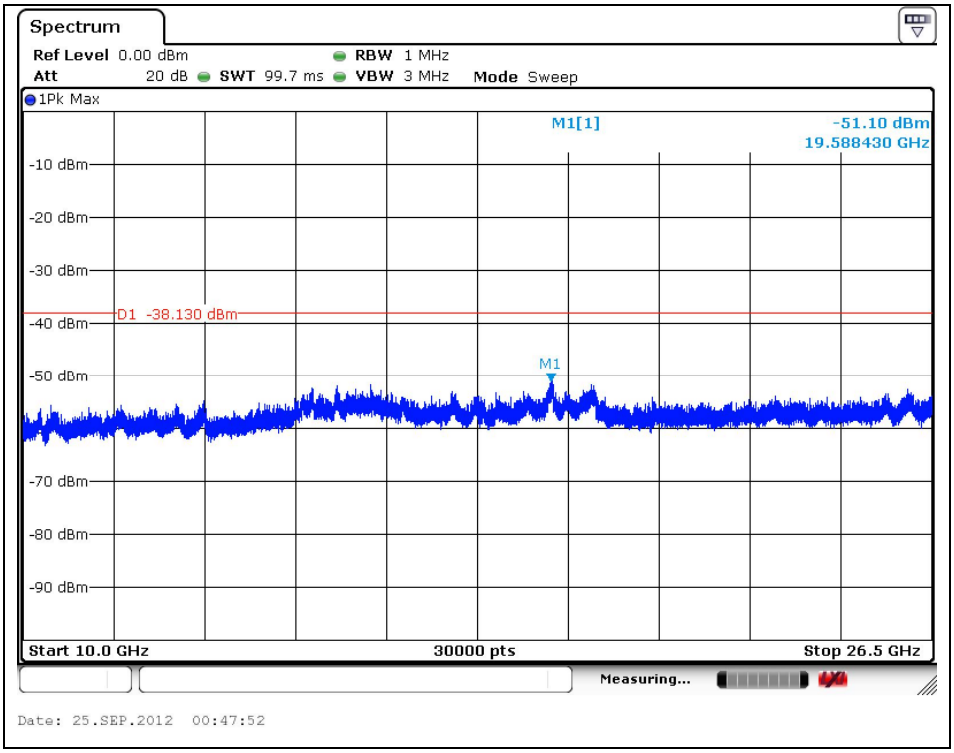


Note:
Offset (dB) = Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
2 390.00	20.84	-60.66	-39.82
2 400.00	20.84	-50.50	-29.66
7 838.01	23.43	-54.16	-30.73
19 599.43	-	Noise floor	-

Middle Channel

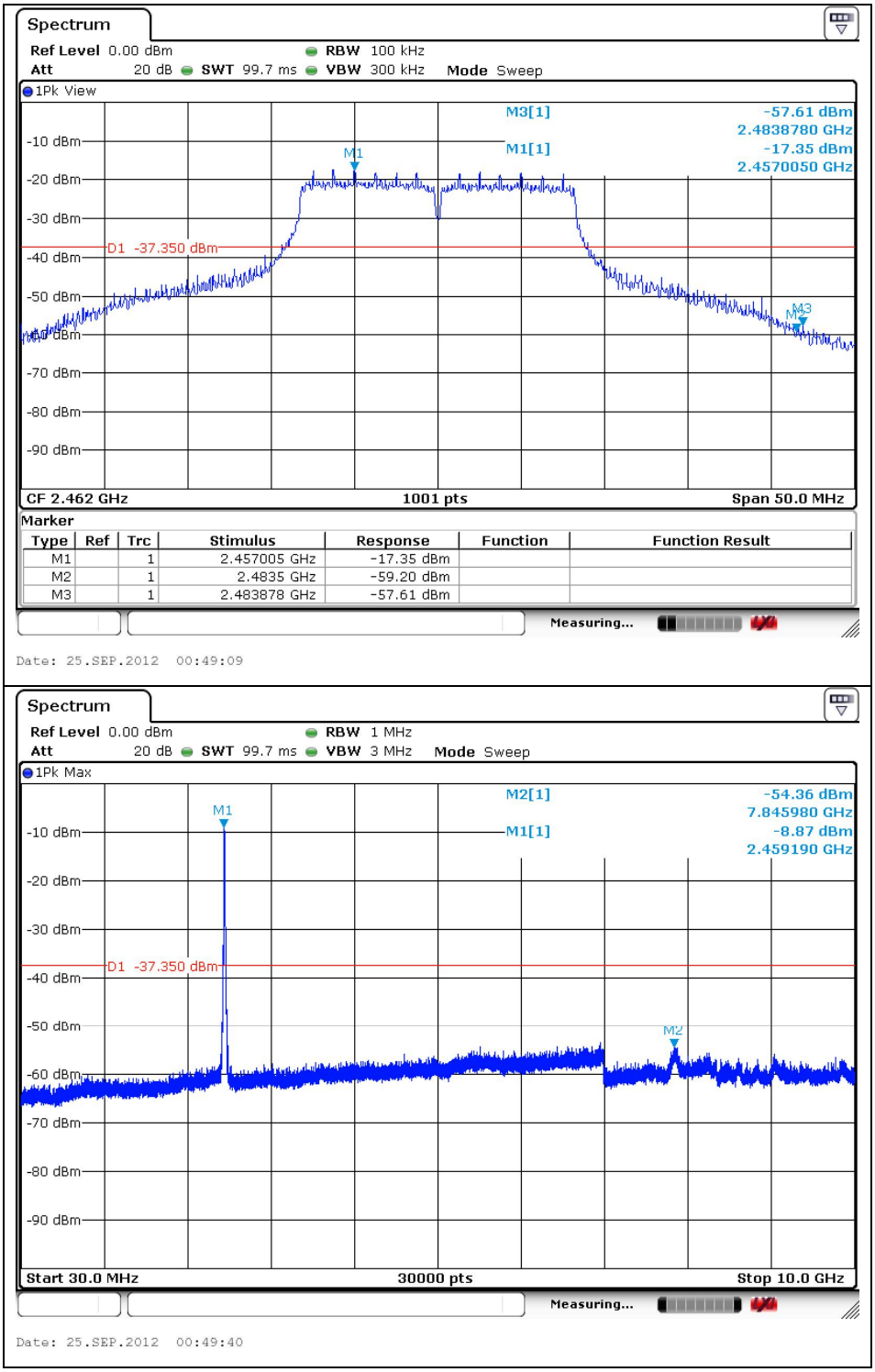


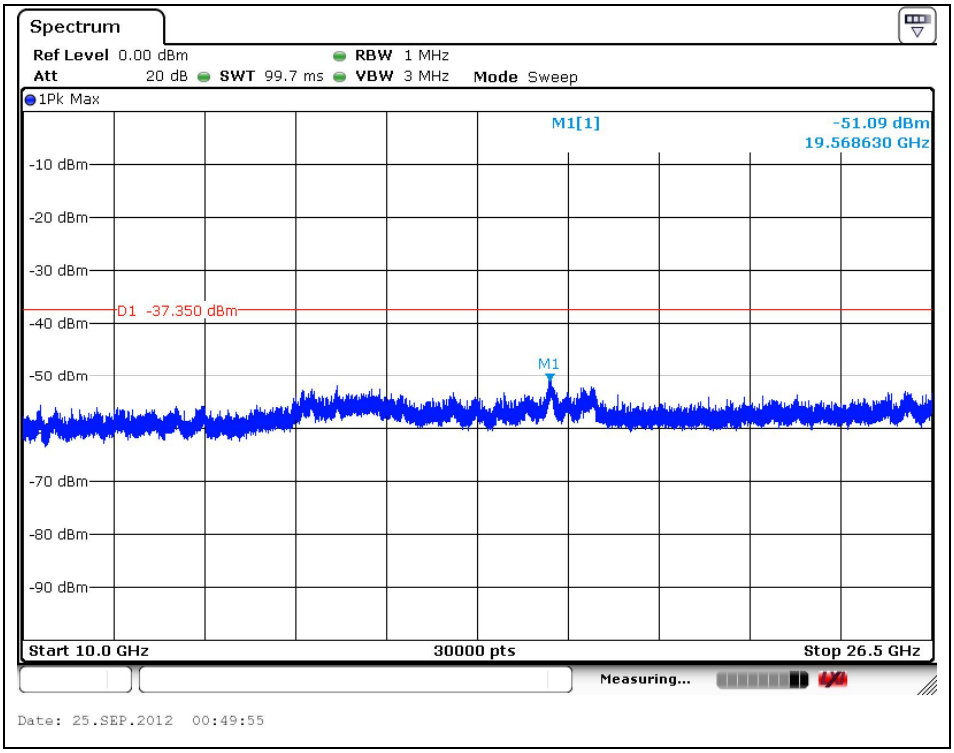


Note:
Offset (dB) = Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
7 850.30	23.46	-54.33	-30.87
19 588.43	-	Noise floor	-

High Channel





Note:
Offset (dB) = Attenuator(dB) + Cable loss (dB)
Result (dB m) = Spurious offset (dB) + Reading values (dB m)

Frequency (MHz)	Spurious offset (dB)	Reading values (dB m)	Result (dB m)
2 483.50	20.87	-59.20	-38.33
2 483.88	20.87	-57.61	-36.74
7 845.98	23.45	-54.36	-30.91
19 568.63	-	Noise floor	-

3. Receiver Radiated spurious emissions

3.1. Test setup - Same as clause 2.1.

3.1.1. Receiver Radiated Spurious Emissions - Same as clause 2.1.1.

3.2. Limit

According to §15.109(a), Except for Class A digital devices, the field strength of radiated emission from unintentional radiator at a distance of 3 m shall not exceed the following values:

Frequency (㎒)	Distance (Meters)	Radiated (㏈μV/m)	Radiated (μV/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

3.3. Test Procedures - Same as clause 2.3.

Radiated emissions from the EUT were measured according to the dictates of KDB558074.

3.3.1. Test Procedures for Radiated Spurious Emissions- Same as clause 2.3.1.

3.4. Test Results

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

3.4.1. Spurious Radiated Emission (Worst case configuration_11g mode, 6Mbps)

The frequency spectrum from 30 ㎒ to 26.5 ㎓ was investigated.

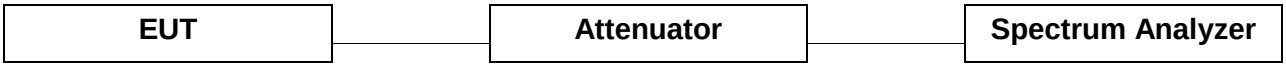
Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (㎒)	Reading (dB㎶)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
41.64	15.30	Peak	H	13.57	-24.43	4.44	40.00	35.56
Above 100.00	Not detected	-	-	-	-	-	-	-

Remark:

1. All spurious emission at channels are almost the same from 30 ㎒ to 26.5 ㎓, so that the middle channel was chosen at representative in final test.
2. Actual = Reading + AF + AMP + CL

4. 6 dB Bandwidth Measurement and 99 % BW

4.1. Test Setup



4.2. Limit

According to §15.247(a)(2), systems using digital modulation techniques may operate in the 902 ~928 ㎒, 2 400 ~ 2 483.5 ㎒, and 5 725 ~ 5 825 ㎒ bands. The minimum of 6 ㏈ Bandwidth shall be at least 500 ㎑

4.3. Test Procedure

4.3.1. 6 dB bandwidth

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.

The test follows section 5.1 of FCC KDB Publication 558074

1. Set resolution bandwidth (RBW) = 1 – 5 % of the emission bandwidth (EBW).
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude point (upper and lower) that are attenuated by 6 ㏈ relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1 – 5 %.

4.3.2. 99% bandwidth

1. Set the spectrum analyzer as SPAN = 2 or 3 times necessary bandwidth, RBW = approximately 1 % of the SPAN, VBW is set to 3 times RBW, Detector = sampling, Trace mode = max hold.
2. Measure lowest and highest frequencies are placed in a running sum until 0.5 % and 99.5 % of the total is reached.
3. Record the SPAN between the lowest and the highest frequencies for the 99 % occupied bandwidth.
4. Repeat until all the test channels are investigated.

4.4. Test Results

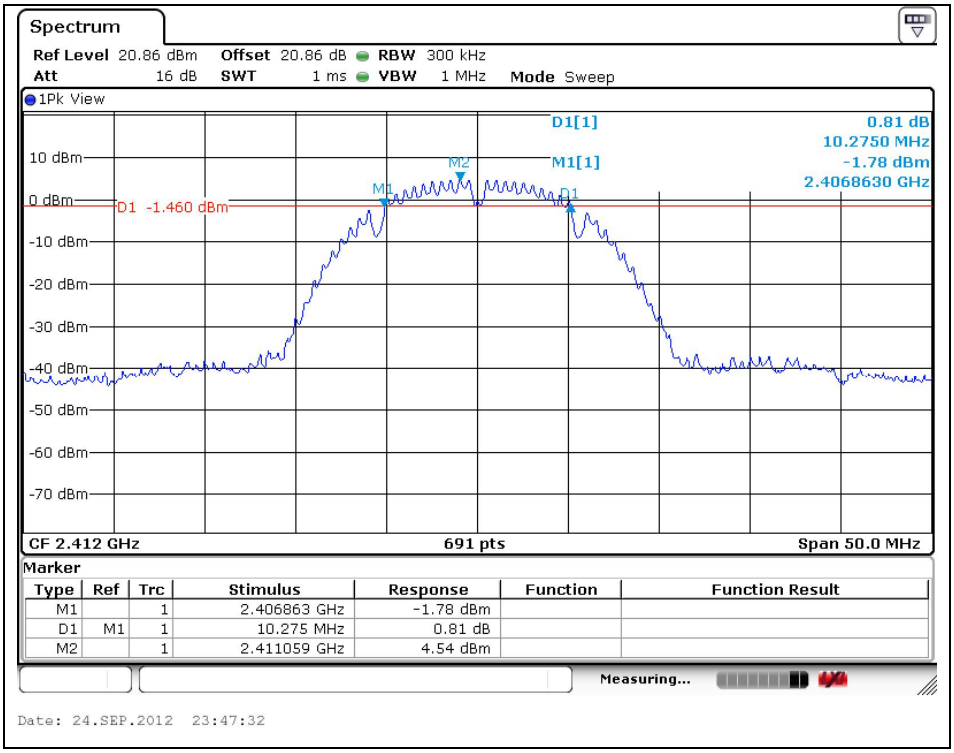
Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

Operation Mode	Data Rate (Mbps)	Channel	Channel Frequency (㎒)	6 ㏈ Bandwidth (㎒)	99 % Bandwidth (㎒)
DSSS (802.11b)	1	Low	2 412	10.28	14.47
		Middle	2 437	10.28	14.33
		High	2 462	10.28	14.40
OFDM (802.11g)	6	Low	2 412	16.57	17.87
		Middle	2 437	16.57	17.80
		High	2 462	16.50	17.87

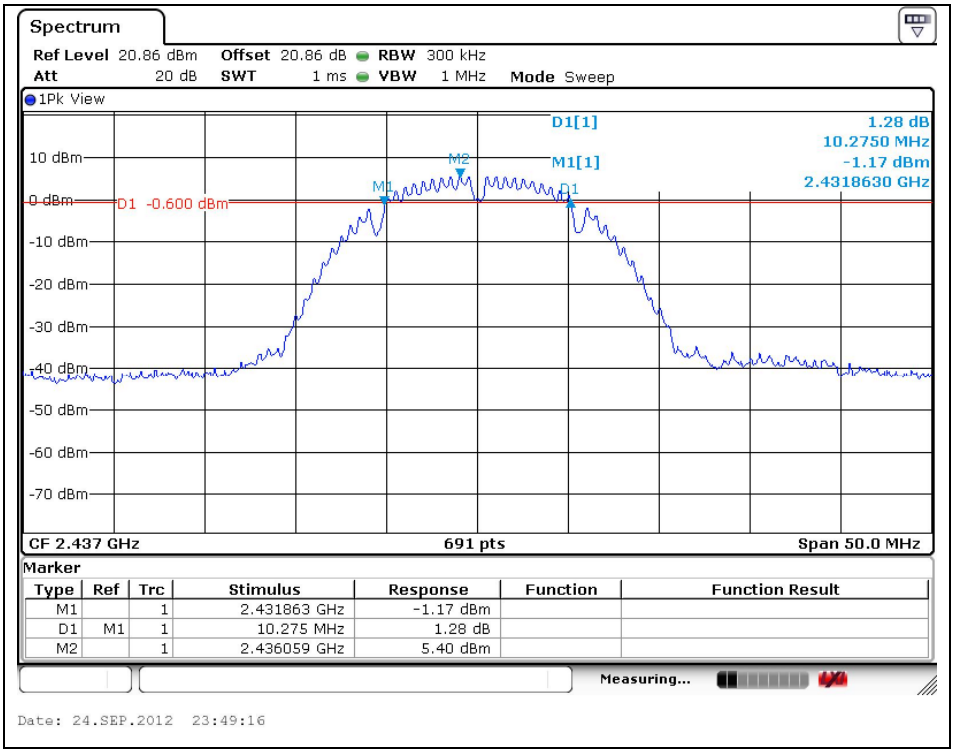
6 dB Bandwidth

DSSS : 802.11b

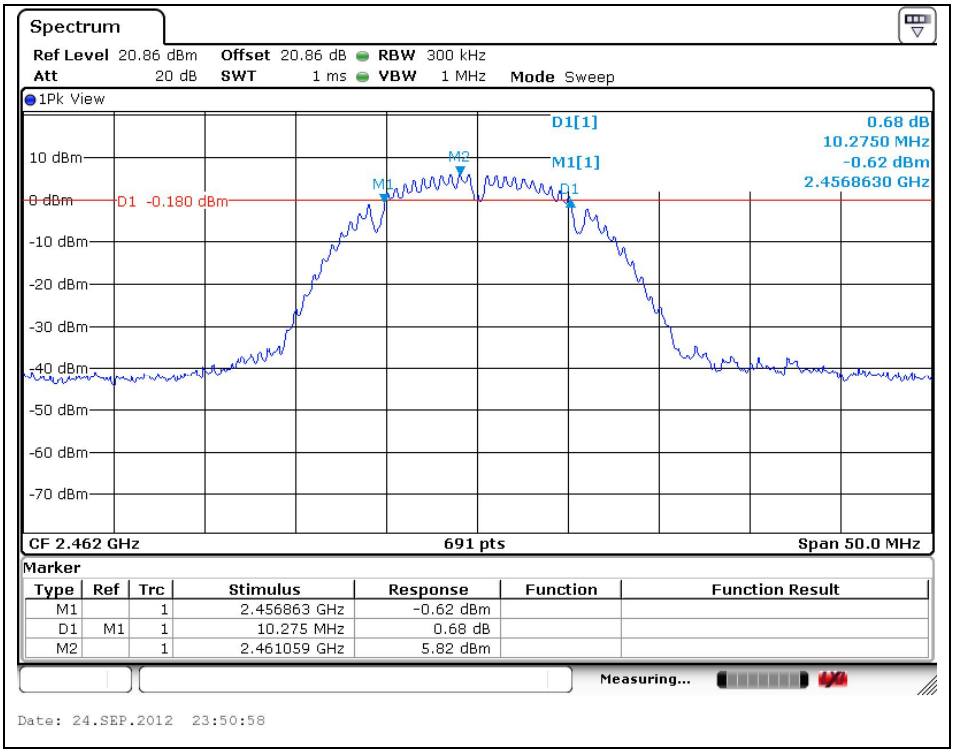
Low Channel



Middle Channel

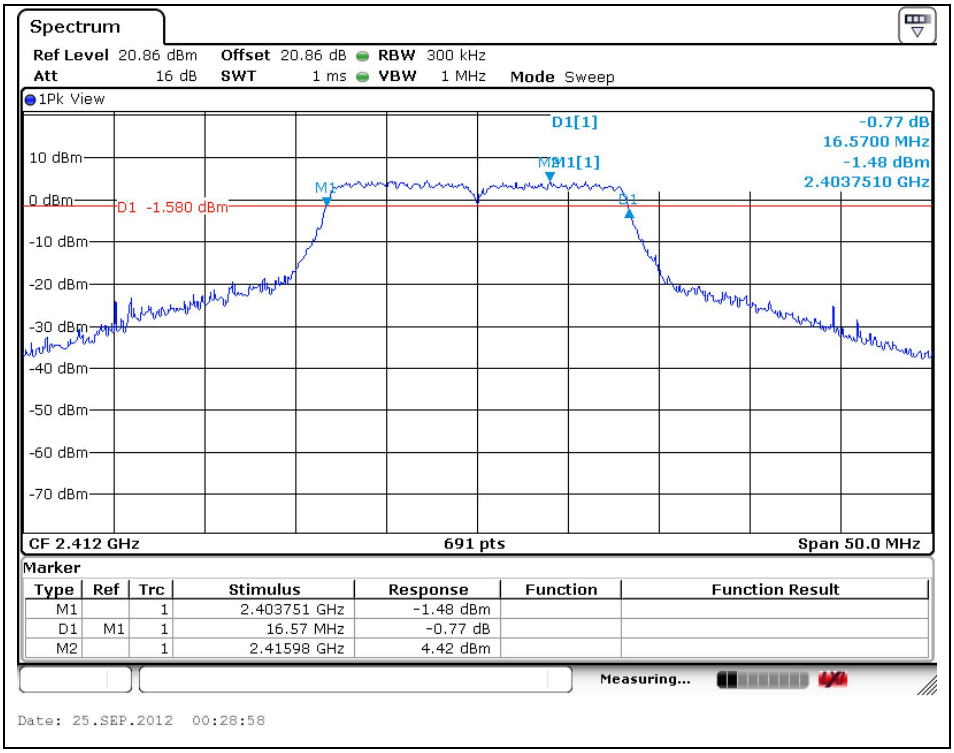


High Channel

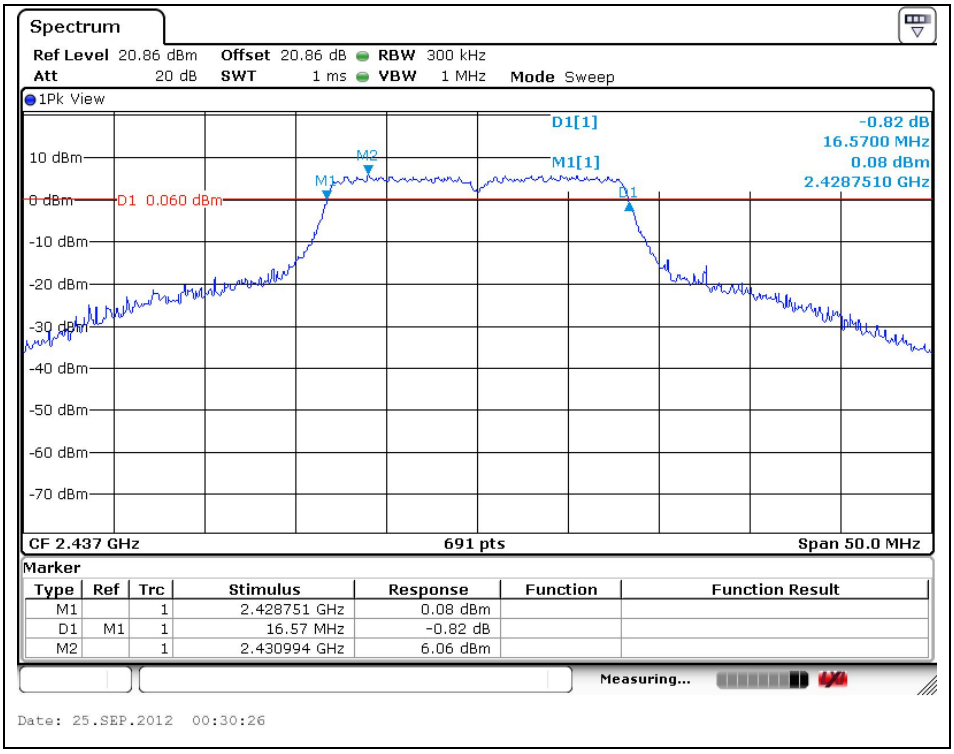


OFDM : 802.11g

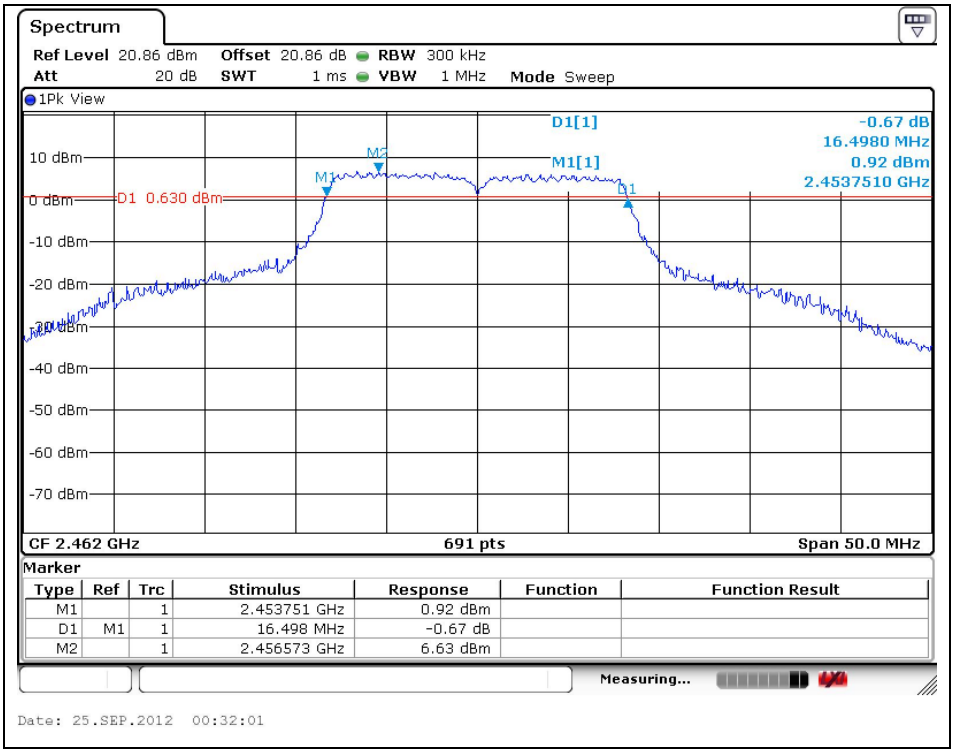
Low Channel



Middle Channel



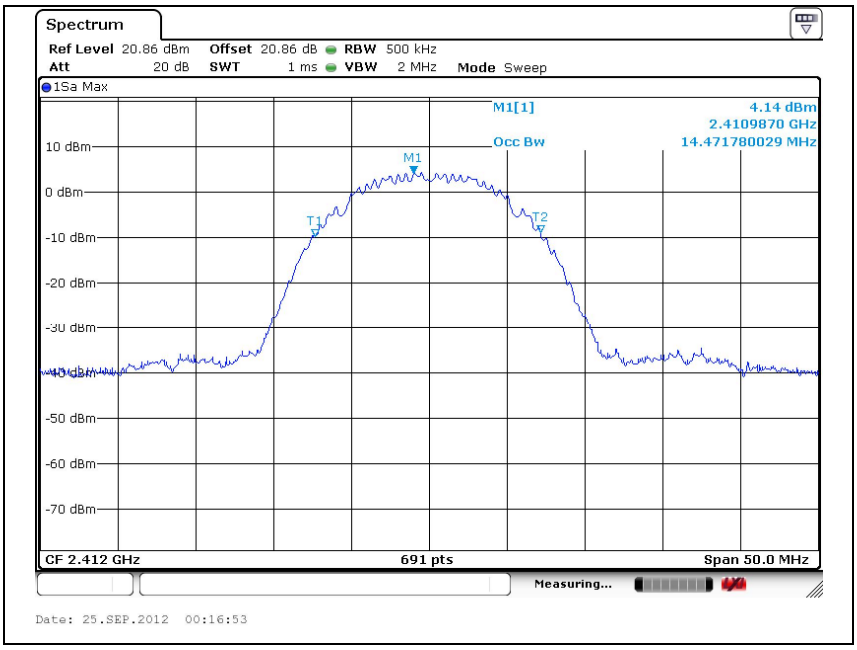
High Channel



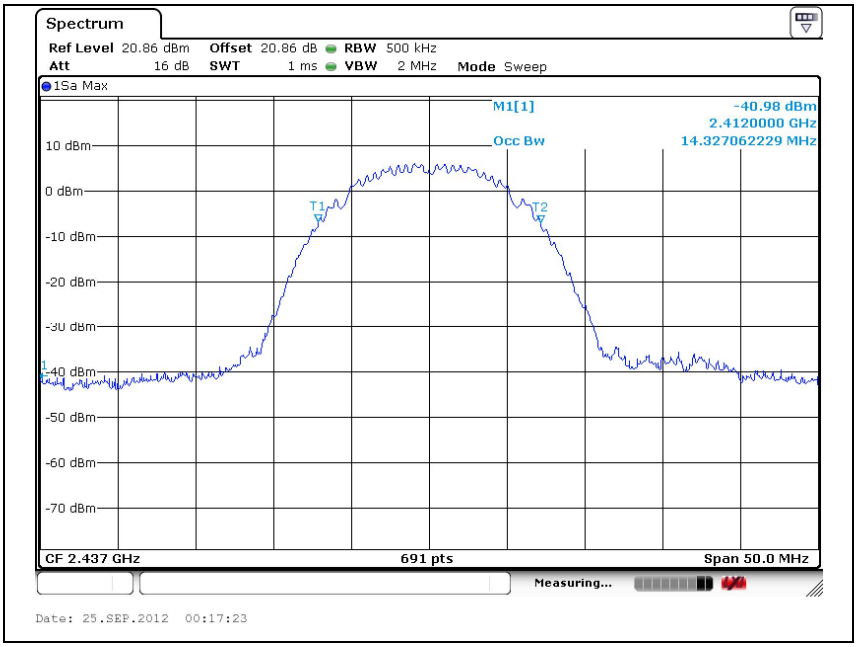
99% Bandwidth

802.11b

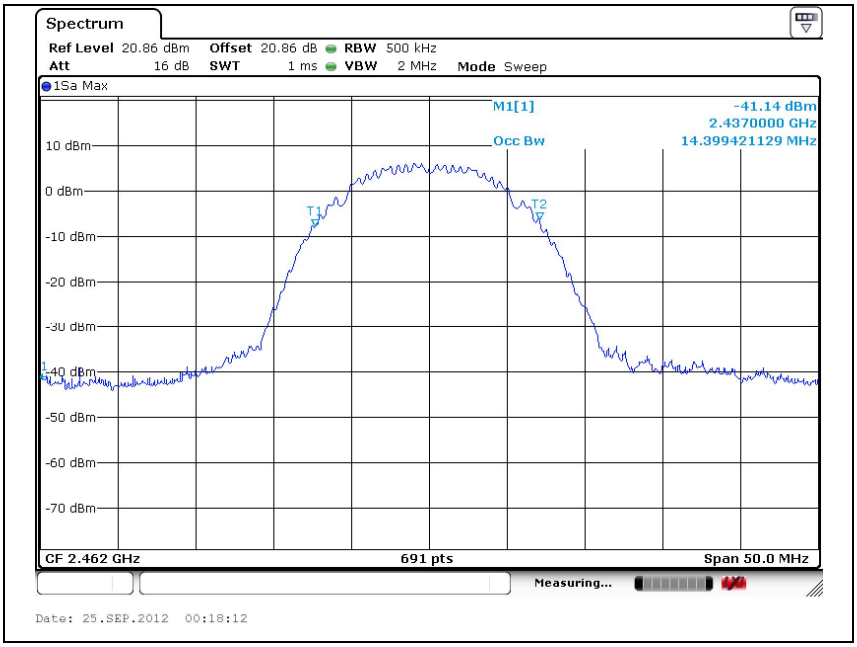
Low channel



Middle channel

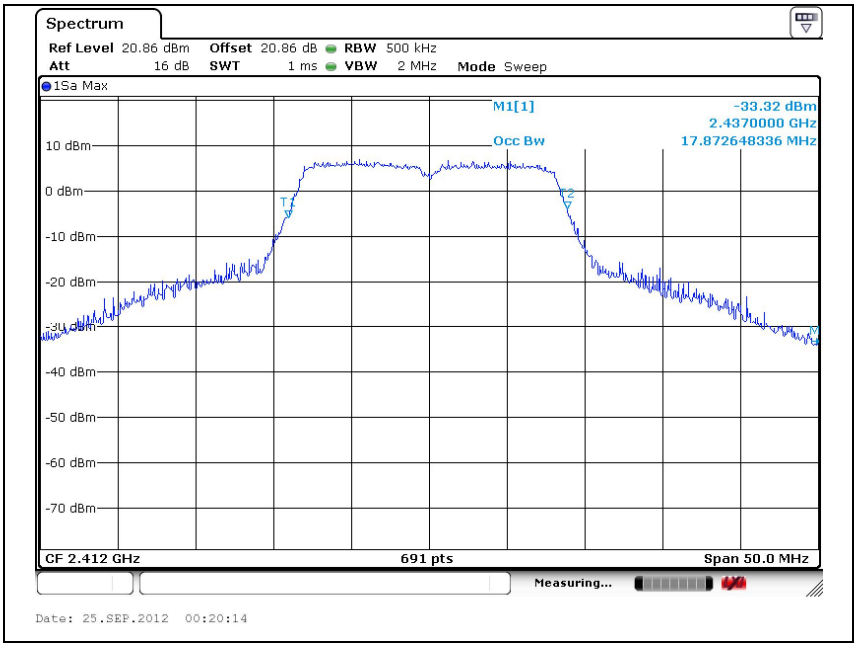


High channel

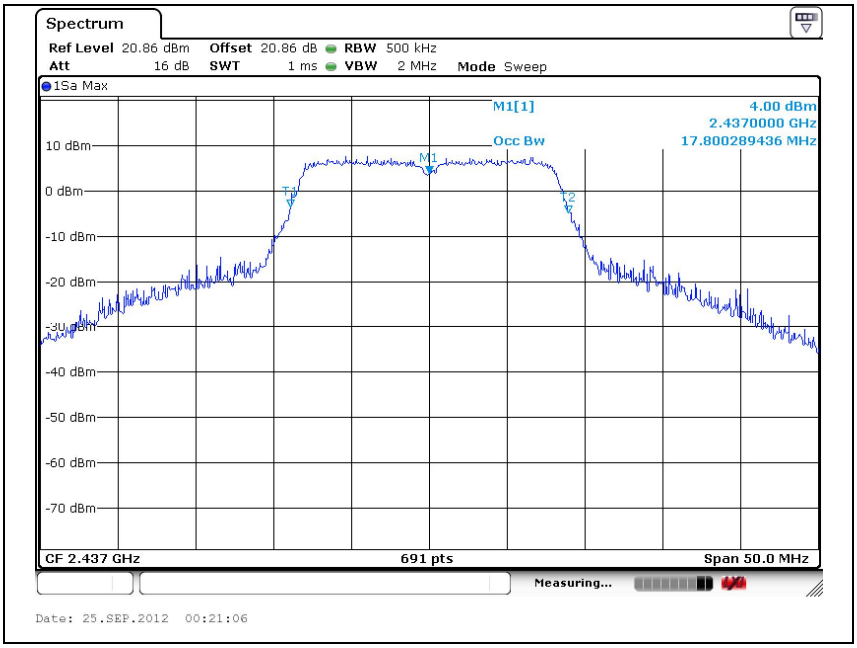


802.11g

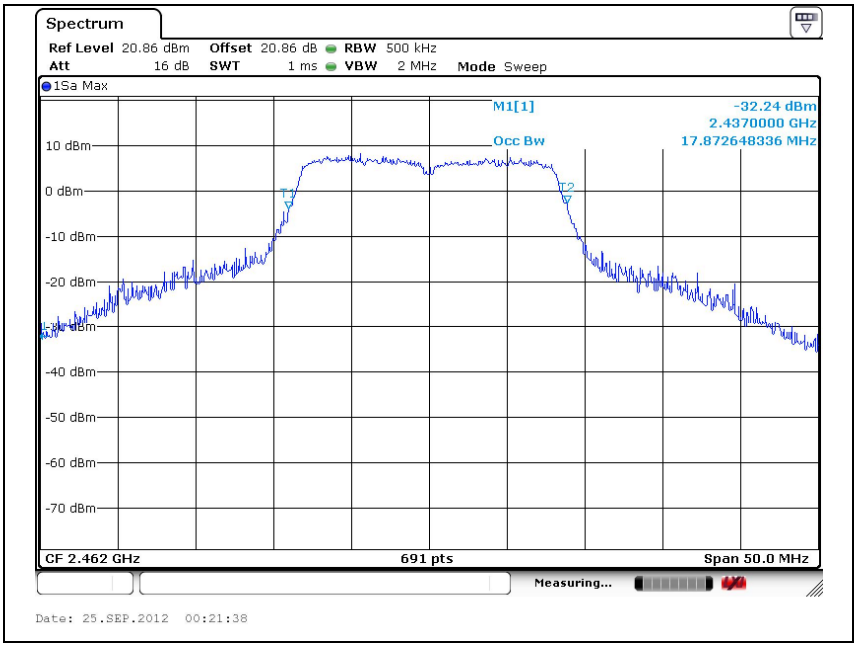
Low channel



Middle channel

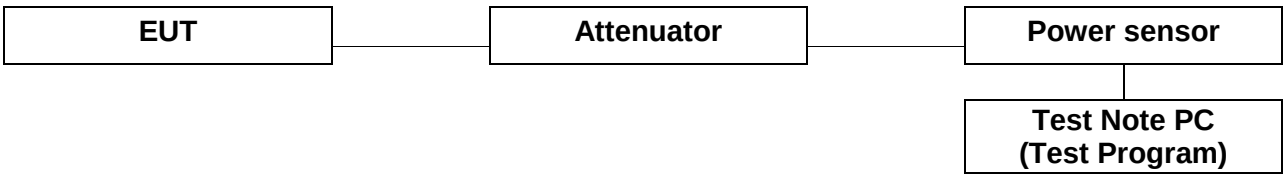


High channel



5. Maximum Peak Output Power Measurement

5.1. Test Setup



5.2. Limit

According to §15.247(b)(3), for systems using digital modulation in the 902 ~ 928 ㎒, 2 400 ~2 483.5 ㎒, and 5 725 ~ 5 850 ㎒ band: 1 Watt. As an alternative to a peak power measurement, compliance with the one watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antenna elements. The average must not include any intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

According to §15.247(b)(4), the conducted output power limit specified in paragraph(b) of this section is based on the use of antenna with directional gains that do not exceed 6 ㏈i. Except as shown in paragraph(c) of this section, if transmitting antenna of directional gain greater than 6 ㏈i are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraph (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in ㏈ that the directional gain of the antenna exceeds 6㏈i.

5.3. Test Procedure

5.3.1. 11b, g

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.
3. Test program : (S/W name : R&S Power Viewer, Version : 3.2.0)
4. Measure peak & average power each channel.

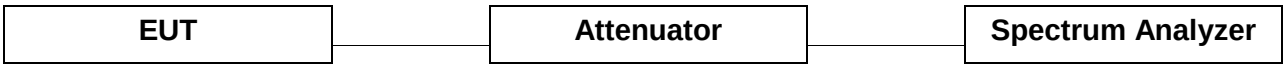
5.4. Test Results

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

Mode	Channel	Channel Frequency (㎒)	Data Rate (Mbps)	Attenuator + Cable offset (dB)	Average power Result (dB m)	Peak Power Result (dB m)
DSSS (802.11b)	Low	2 412	1	21.90	16.96	19.05
			2		16.46	19.45
			5.5		16.33	19.14
			11		16.30	19.72
	Middle	2 437	1	21.91	17.54	20.72
			2		17.39	20.47
			5.5		17.32	20.42
			11		17.20	20.60
	High	2 462	1	21.91	17.43	20.58
			2		17.41	20.62
			5.5		17.39	20.43
			11		17.36	20.76
OFDM (802.11g)	Low	2 412	6	21.90	15.59	23.74
			9		15.56	23.68
			12		15.37	23.65
			18		15.37	23.40
			24		15.29	23.58
			36		15.21	23.37
			48		12.11	21.37
			54		12.23	21.94
	Middle	2 437	6	21.91	17.00	23.94
			9		16.58	23.52
			12		16.42	23.66
			18		16.96	23.76
			24		16.90	23.64
			36		16.96	23.84
			48		13.84	22.40
			54		13.98	22.42
	High	2 462	6	21.91	16.66	23.72
			9		16.61	23.57
			12		16.61	23.83
			18		16.43	23.75
			24		16.43	23.68
			36		16.52	23.55
			48		13.40	22.12
			54		13.44	22.09

6. Power Spectral Density Measurement

6.1. Test Setup



6.2. Limit

§15.247(e) For digitally modulated system, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 ㏈ m in any 3 ㎑ band any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

6.3. Test Procedure

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.
The measurements are recorded using the PKPSD measurement procedure in section 5.3 of KDB 558074.

1. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
2. Set the analyzer span to 5 – 30 % greater than the EBW.
3. Set the RBW = 100 ㎑
4. Set the VBW ≥ 300 ㎑
5. Detector = Peak
6. Sweep time = Auto couple
7. Trace mode = Max hold
8. Allow trace to fully stabilize
9. Use the peak marker function to determine the maximum level in any 100 ㎑ band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent level in 3 ㎑ by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where : BWCF =10log(3 ㎑/100 ㎑ = -15.2 ㏈).
11. The resulting PSD level must be ≤ 8 ㏈m.

6.4. Test Results

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

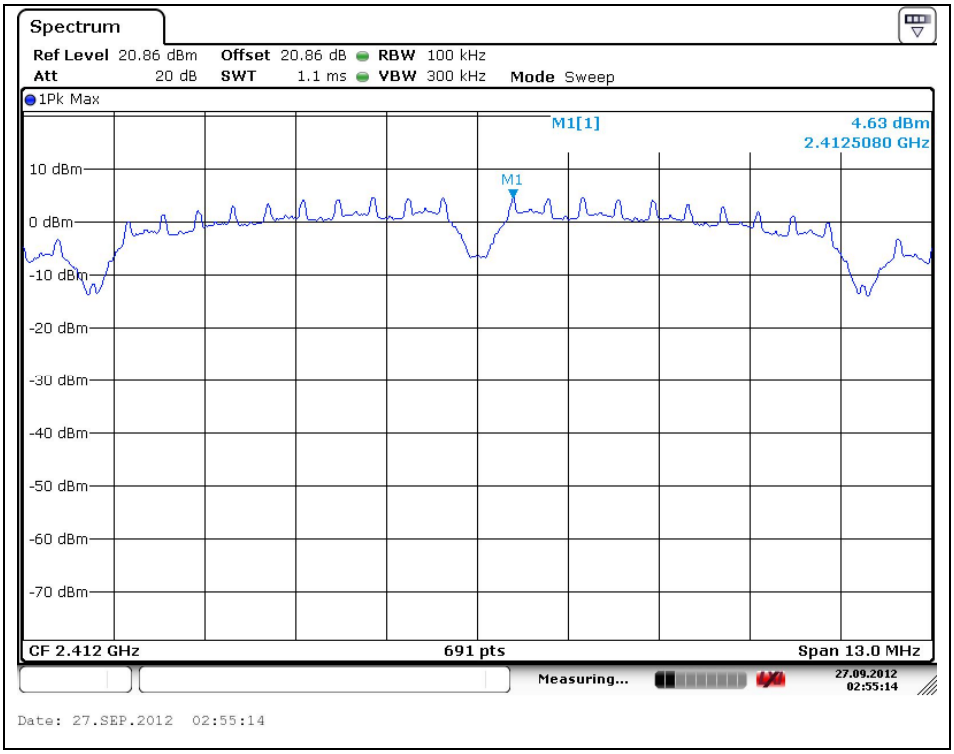
Operation Mode	Data Rate (Mbps)	Channel	Frequency	Measured PSD (dB m)	Bandwidth Correction Factor (dB)	Corrected PSD (dB m)	Maximum Limit (dB m)
DSSS (802.11b)	1	Low	2 412 ㎒	4.63	-15.20	-10.57	8
		Middle	2 437 ㎒	5.42	-15.20	-9.78	8
		High	2 462 ㎒	5.76	-15.20	-9.44	8
OFDM (802.11g)	6	Low	2 412 ㎒	1.46	-15.20	-13.74	8
		Middle	2 437 ㎒	2.81	-15.20	-12.39	8
		High	2 462 ㎒	3.78	-15.20	-11.42	8

Note;

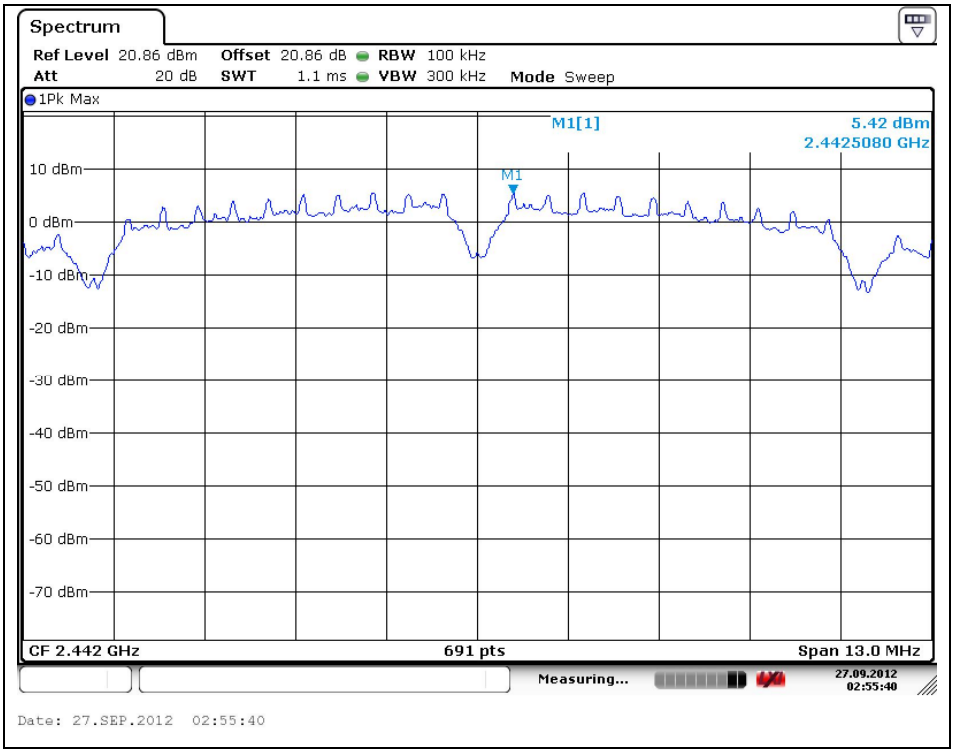
Corrected Power Spectral Density (dB m) = Measured Power Spectral Density (dB m) + Bandwidth Correction Factor (dB)

DSSS : 802.11b

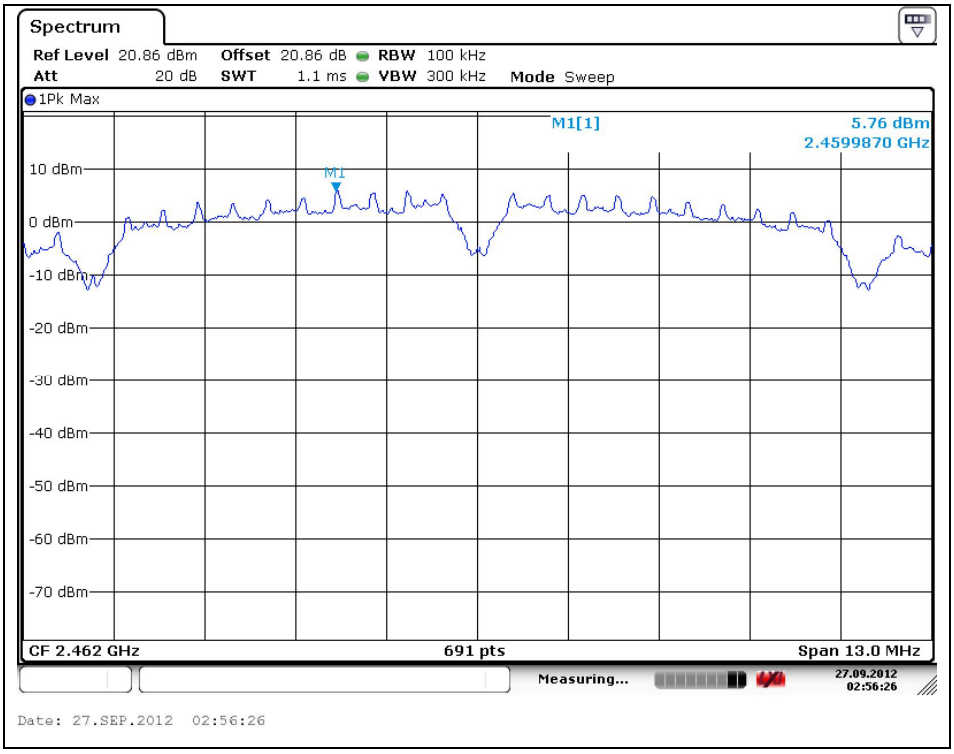
Low Channel



Middle Channel

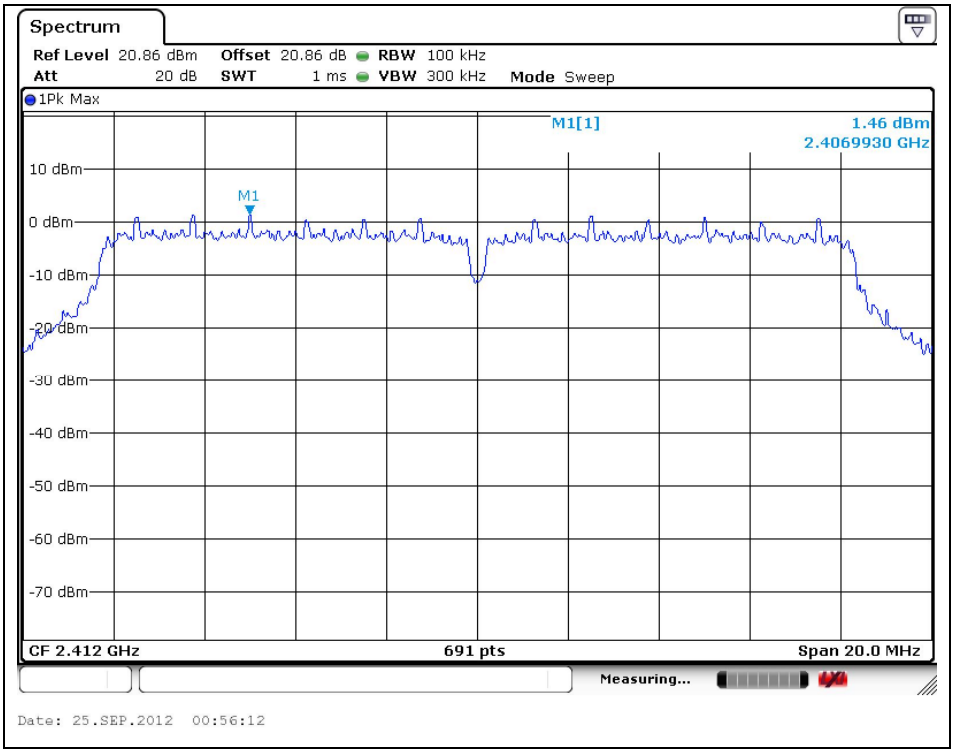


High Channel

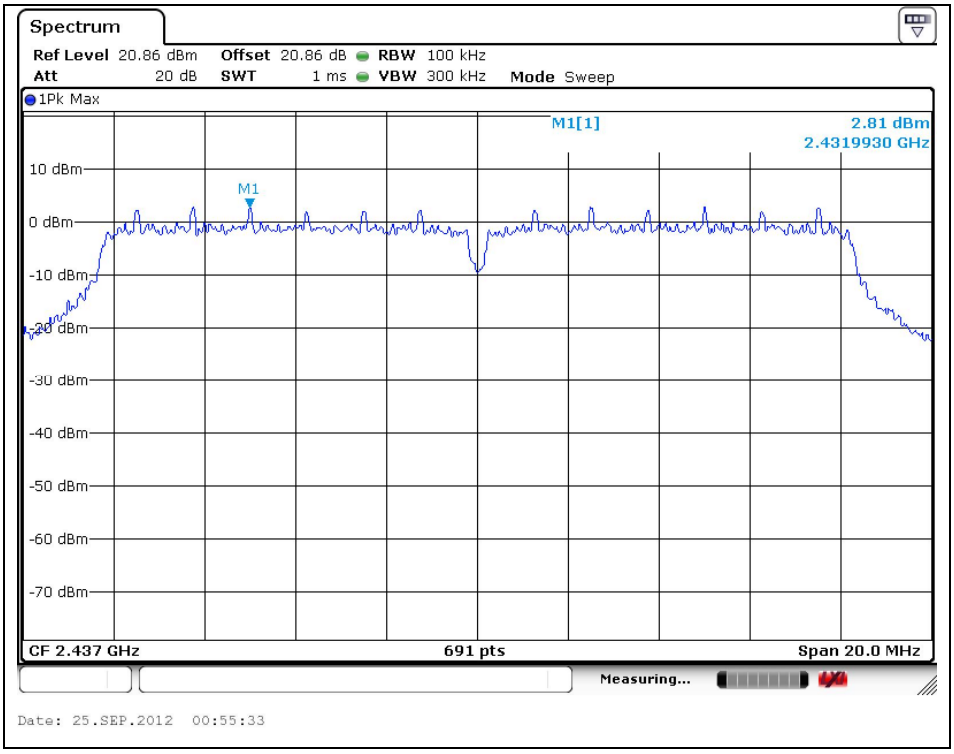


OFDM : 802.11g

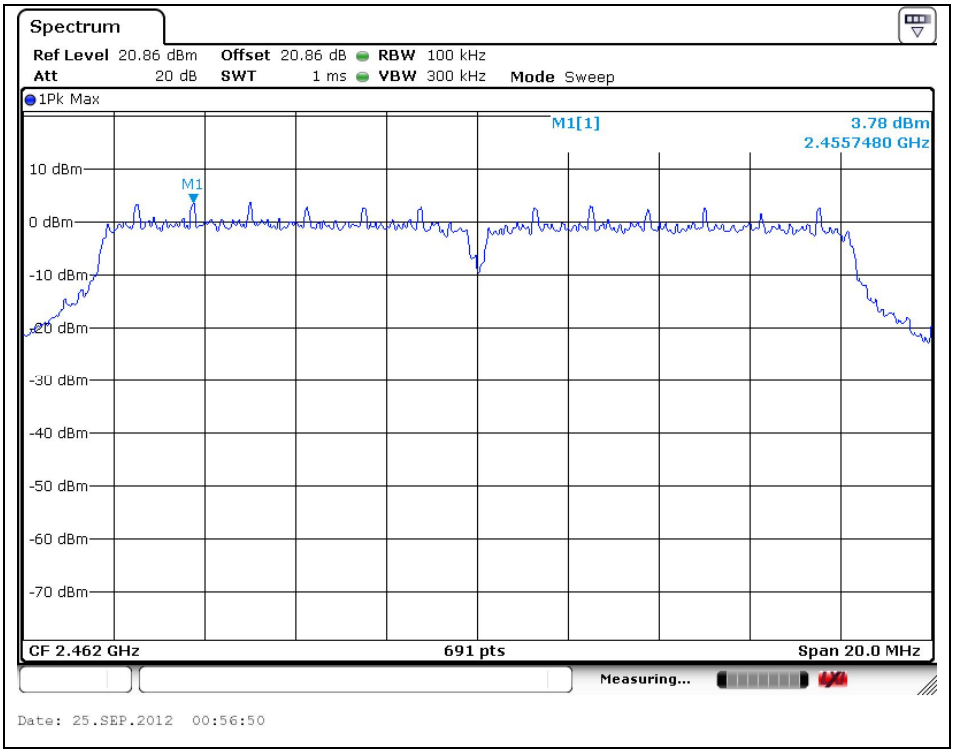
Low Channel



Middle Channel

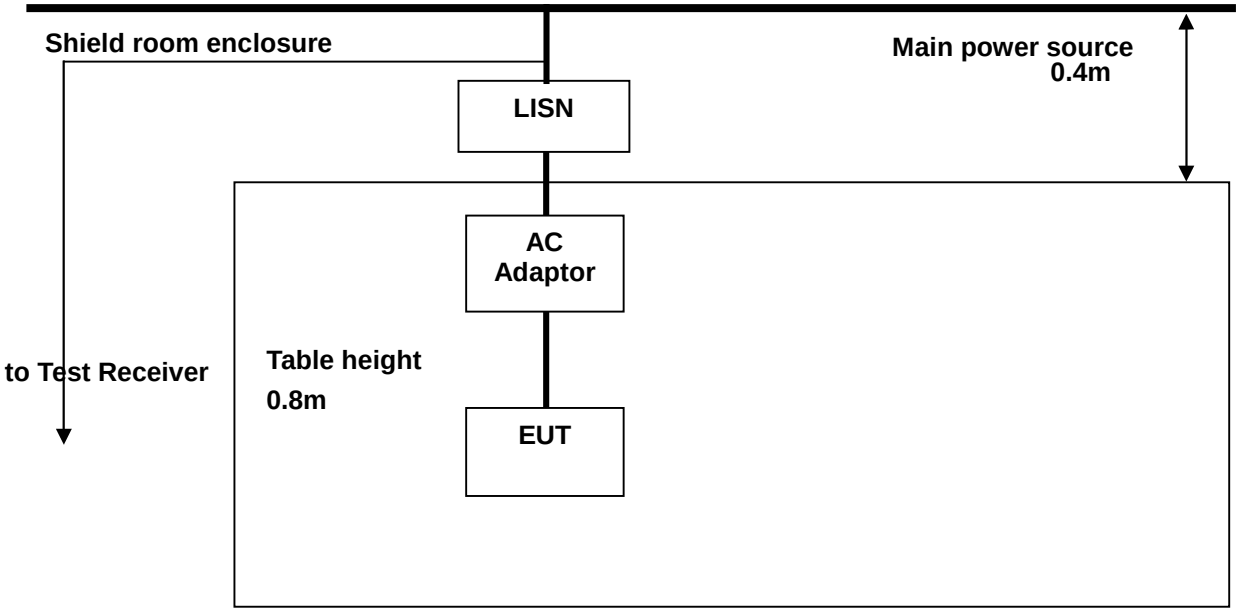


High Channel



7. Transmitter AC Power Line Conducted Emission

7.1. Test Setup



7.2. Limit

According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network(LISN).
Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (㎒)	Conducted limit (dB㎶)	
	Quasi-peak	Average
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.

7.3. Test Procedures

All data rates and modes were investigated for this test. The full data for the worst case data rate are reported in this section.
AC line conducted emissions from the EUT were measured according to the dictates of ANSI C63.4-2003

1. The test procedure is performed in a 6.5m × 3.6m× 3.6m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m(W)× 1.5 m(L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. The excess power cable between the EUT and the LISN was bundled. All connecting cables of EUT were moved to find the maximum emission.

7.4. Test Results (Worst case configuration_11b mode, 1 Mbps, middle channel)

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Ambient temperature : (24 ± 2) ℃
Relative humidity : 47 % R.H.

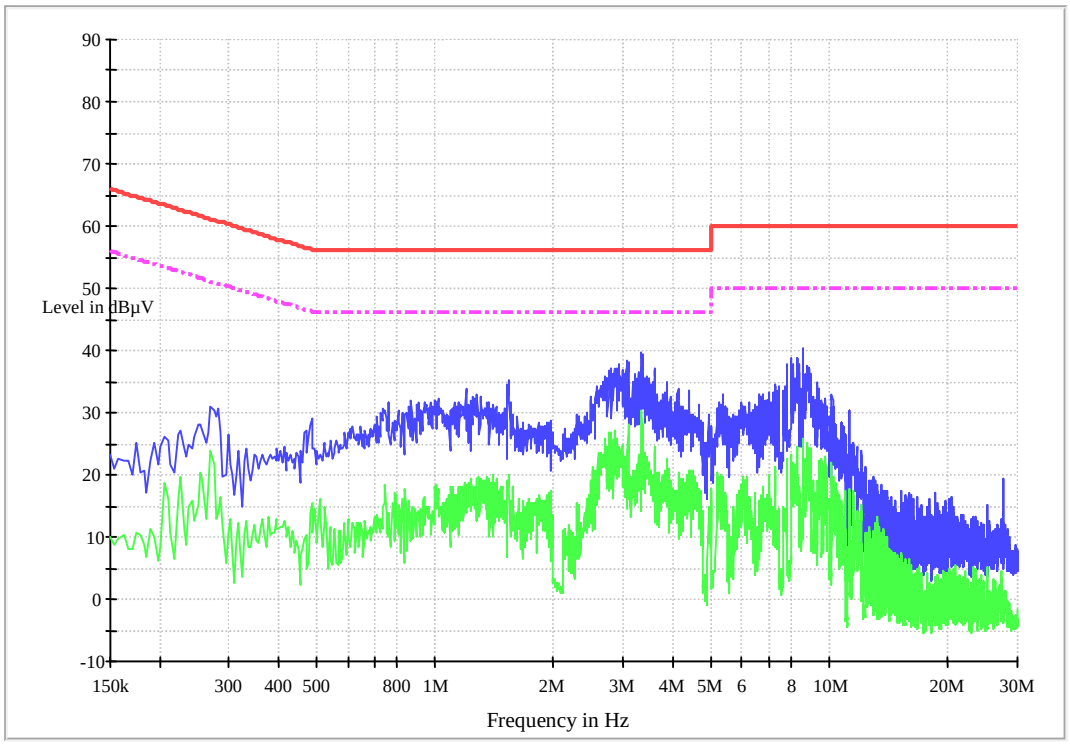
Frequency range : 0.15 ㎒ – 30 ㎒
Measured Bandwidth : 9 ㎑

FREQ.	LEVEL(dB㎶)		LINE	LIMIT(dB㎶)		MARGIN(dB)	
(㎒)	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.27	28.24	23.70	H	61.12	51.12	32.88	27.42
0.49	20.33	16.24	H	56.17	46.17	35.84	29.93
1.53	26.96	18.52	H	56.00	46.00	29.04	27.48
3.37	28.49	23.76	H	56.00	46.00	27.51	22.24
8.57	28.06	16.44	H	60.00	50.00	31.94	33.56
11.22	18.17	13.41	H	60.00	50.00	41.83	36.59
0.28	27.90	23.52	N	60.76	50.76	32.86	27.24
0.43	27.33	20.64	N	57.25	47.25	29.92	26.61
1.11	29.42	17.69	N	56.00	46.00	26.58	28.31
3.29	35.60	26.77	N	56.00	46.00	20.40	19.23
9.05	35.31	24.61	N	60.00	50.00	24.69	25.39
14.06	8.64	3.19	N	60.00	50.00	51.36	46.81

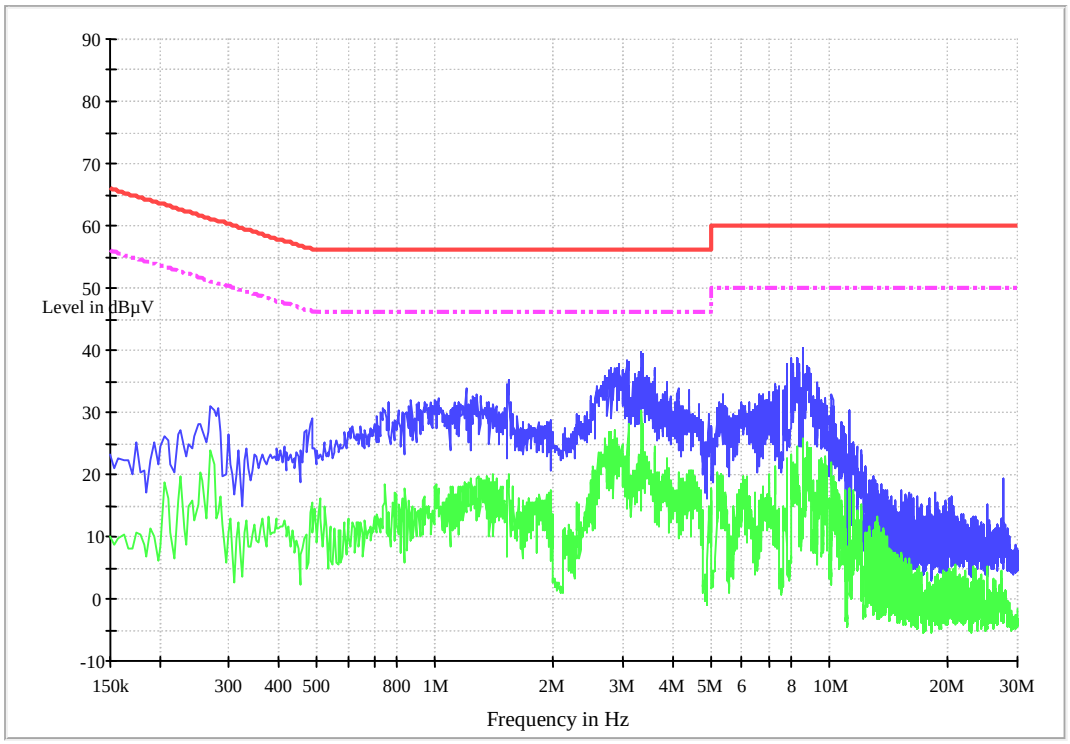
Note ;
1. Line (H): Hot, Line (N): Neutral
2. All modes of operation were investigated and the worst-case emissions are reported using 11b_1 Mbps.
3. The limit for Class B device(s) from 150 ㎑ to 30 ㎒ are specified in Section of the Title 47 CFR.
4. Traces shown in plot mad using a peak detector and average detector.
5. Deviations to the Specifications: None.

Plots of Conducted Power line

Test mode : (Hot)



Test mode : (Neutral)



8. Antenna Requirement

8.1. 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 6 dBi are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dBi.

8.2. Antenna Connected Construction

Antenna used in this product is Internal type (chip) with gain of -0.35 dBi.