



Test Report

FCC Part 15.247

DTS Devices operating in range 2400-2483.5MHz

FOR:

Psion Teklogix Inc.

Model Name: 7545

FCC ID: GM37545LBWA

IC ID: 2739D-7545LBWA

TEST REPORT #: EMC_PSION_006_10001_15.247_WLAN_rev1

DATE: 2010-04-15



**Bluetooth Qualification
Test Facility
(BQTF)**



**FCC listed:
A2LA
accredited**

**IC recognized #
3462B**

CETECOM Inc.

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Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

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1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.247 of the Code of Federal Regulations.

Company	Description	Model #
Psion Teklogix Inc.	Handheld Computer	7545

This report is reviewed by:

Marc Douat

2010-04-15 EMC & Radio (Test Lab Manager)

Date Section Name Signature

This report is prepared by:

Satya Radhakrishna

2010-04-15 EMC & Radio (EMC Project Engineer)

Date Section Name Signature

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Responsible Test Lab Manager:	Heiko Strehlow
Responsible Project Leader:	Satya Radhakrishna

2.2 Identification of the Client

Applicant's Name:	Psion Teklogix Inc.
Street Address:	2100 Meadowvale Boulevard
City/Zip Code	Mississauga, Ontario/ L5N 7J9
Country	Canada
Contact Person:	Sada Dharwarkar
Phone No.	905 812 6200 x 3358
Fax:	905 812 6300
e-mail:	Sada.dharwarkar@psionteklogix.com

2.3 Identification of the Manufacturer

Same as above

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	7545
Model No:	7545
Product Type:	Handheld computer
Hardware Revision :	V1
Software Revision :	V1
FCC-ID:	GM37545LBWA
IC-ID :	2739D-7545LBWA
Frequency:	ISM Band 2400-2483.5 MHz
Type(s) of Modulation:	CCK, OFDM
Antenna Gain:	2.0 dBi Max.
Equipment Classification:	<input type="checkbox"/> Fixed <input type="checkbox"/> Vehicular <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Module
Power Supply:	3.7V battery
Temperature Range:	0-70°C

3.2 Identification of the Equipment under Test (EUT)

EUT #	Model Number	Serial Number	HW Version	SW Version
1	7545	STAPTA08001	V1	V1

4 Subject Of Investigation

All testing was performed on the product referred to in Section 3 as EUT. EUT operates in the band 2400-2483.5MHz in 802.11b/g mode. All measurements were made with transmit power set to 13.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT operating under all operating modes as per requirements listed in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations. The maximization of portable equipment is conducted in accordance with ANSI C63.4

This device contains a WiFi chip model number LBWA18HEPZ-135 which was earlier integrated in the certified device PX750BT8 manufactured by Psion Teklogix Inc. Conducted data for this device is borrowed from the PX750BT8 and is present in report# EMC_PSION_004_15_247_DSSS_PX750BT8.

5 Radiated Measurements

5.1 Maximum Peak Output Power § 15.247 (b)(1) (Radiated)

5.1.1 Limits

FCC15.247 (b) (1): 4W (36dBm), with antenna gain < 6dBi.

RSS-210 A8.4 (4): 4W (36dBm)

5.1.2 Results:

EIRP is calculated from conducted peak power. Conducted peak power was measured with a peak detector.

802.11 b/g Mode: Conducted peak power measurements

TEST CONDITIONS T _{nom} (23)°C, V _{nom} VDC	Channel Frequency	EIRP (dBm)	EIRP (mW)	Verdict
Sub-band 1: 2400-2483.5MHz (802.11b)	2412	17.70	58.88	PASS
	2437	17.96	62.52	PASS
	2462	16.90	48.98	PASS
Sub-band 1: 2400-2483.5MHz (802.11g)	2412	14.82	30.34	PASS
	2437	14.60	28.84	PASS
	2462	14.38	27.42	PASS

EIRP = conducted power + antenna gain

Antenna Gain =2 dBi

802.11 b/g Mode: EIRP

TEST CONDITIONS T _{nom} (23)°C, V _{nom} VDC	Channel Frequency	EIRP (dBm)	EIRP (mW)	Verdict
Sub-band 1: 2400-2483.5MHz (802.11b)	2412	19.70	93.33	PASS
	2437	19.96	99.08	PASS
	2462	18.90	77.62	PASS
Sub-band 1: 2400-2483.5MHz (802.11g)	2412	16.82	48.08	PASS
	2437	16.60	45.71	PASS
	2462	16.38	43.45	PASS

5.2 Restricted Band Edge Compliance §15.247/15.205

5.2.1 Limits

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

***PEAK LIMIT= 74dBuV/m**

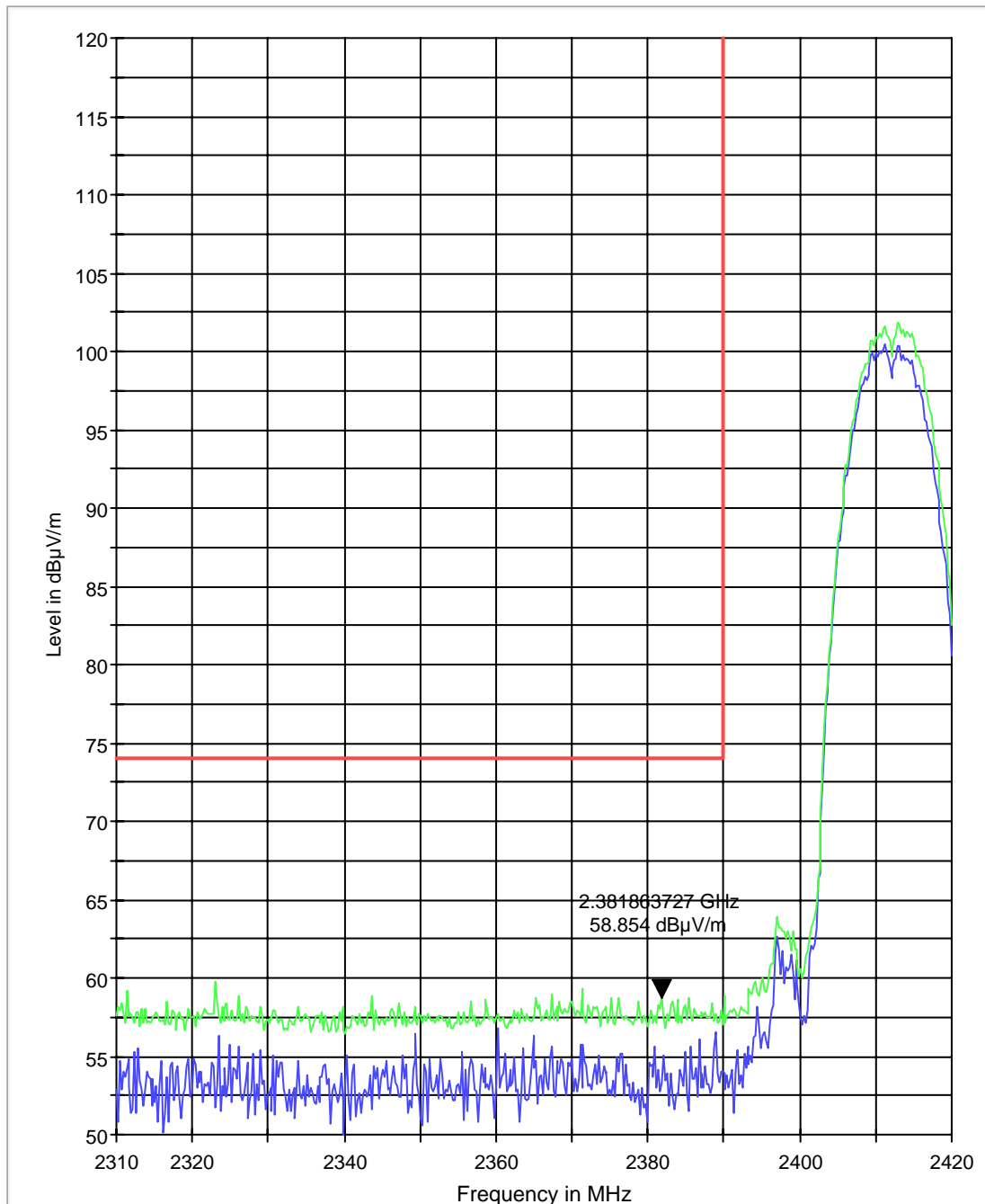
***AVG. LIMIT= 54dBuV/m**

Notes:

1. Radiated emissions are maximized by rotating the EUT 360° at 0.5 meter height increments between 1 and 4 meters.
2. Measurements were performed with the EUT in X, Y and Z orientations with the measurement antenna in both horizontal and vertical polarity. The plots below show the results of the worst case orientation and polarity.

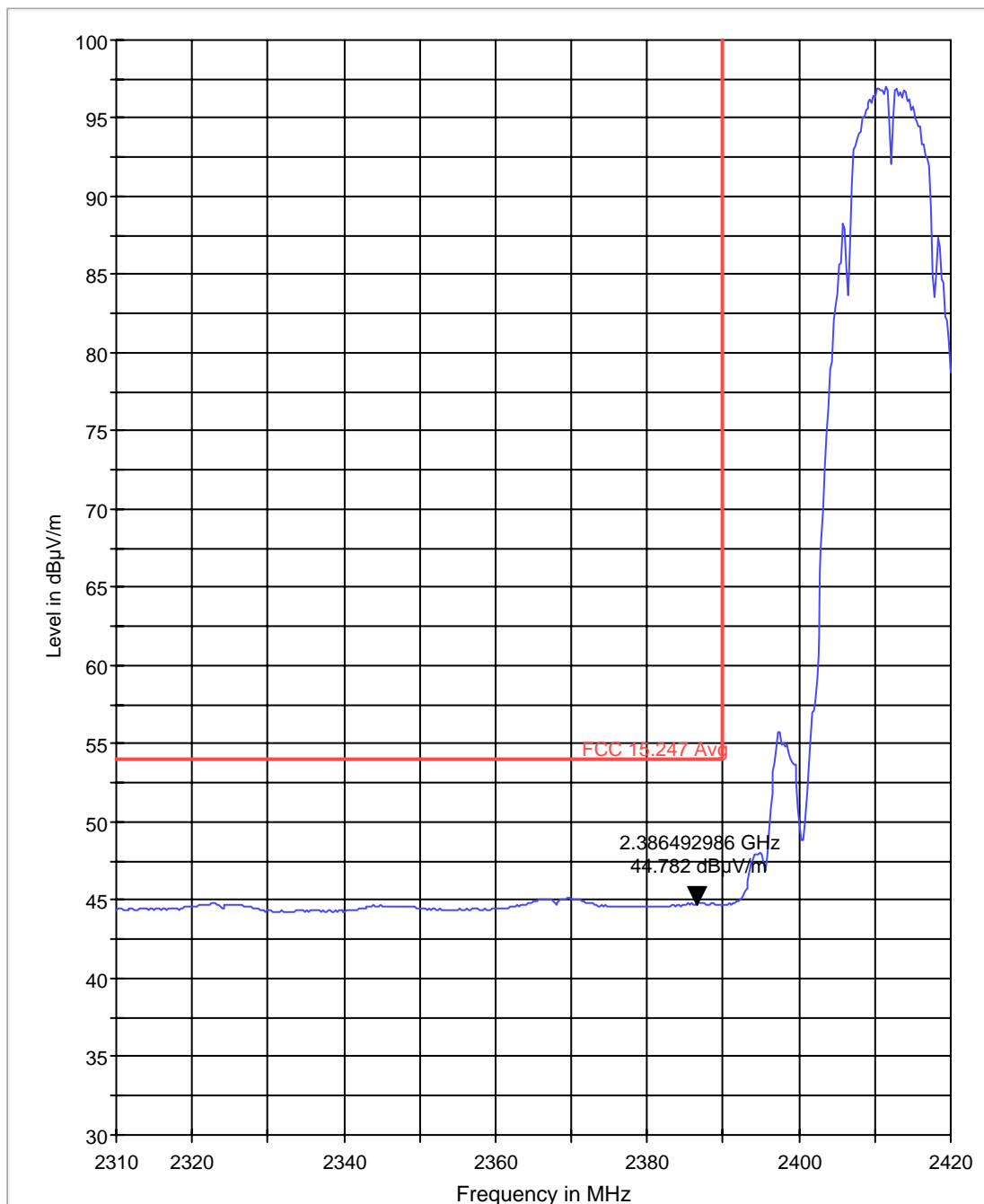
5.2.2 Sub-band 1 802.11b
Lower band edge PEAK

FCC 15.247 LBE Pk 3m



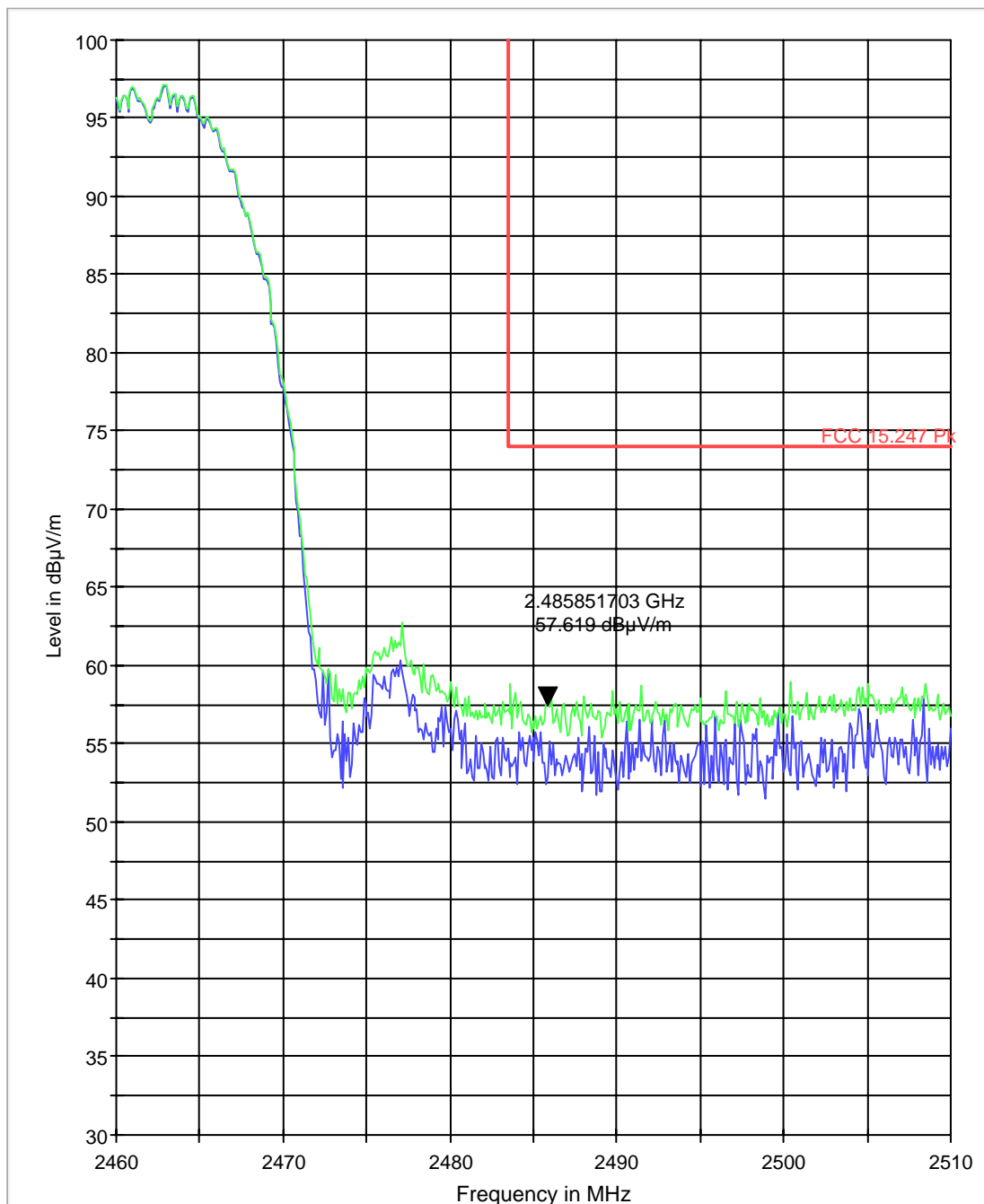
Lower band edge Average

FCC 15.247 LBE Avg 3m



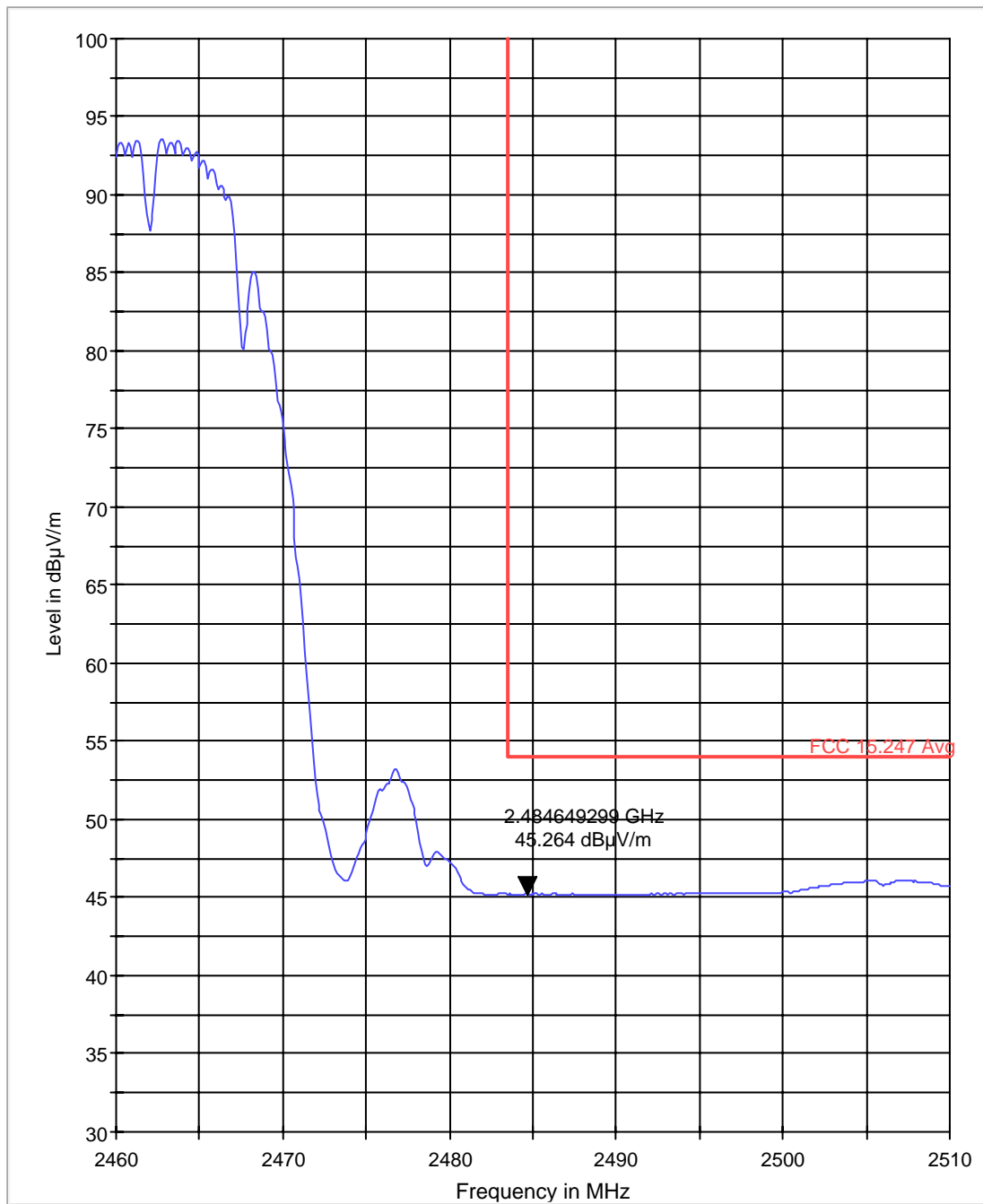
High band edge PEAK

FCC 15.247 HBE Pk 3m



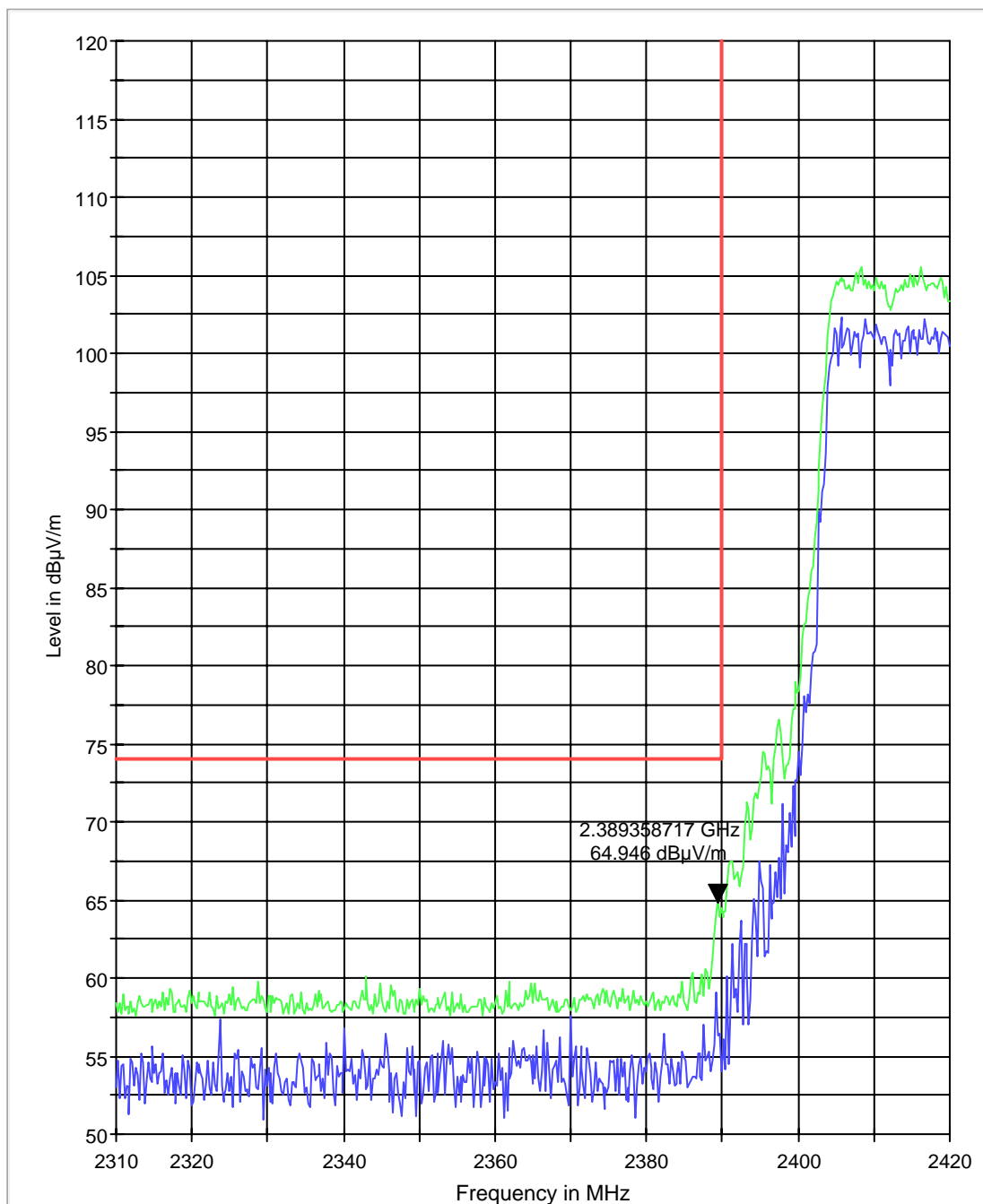
High band edge Average

FCC 15.247 HBE Avg 3m



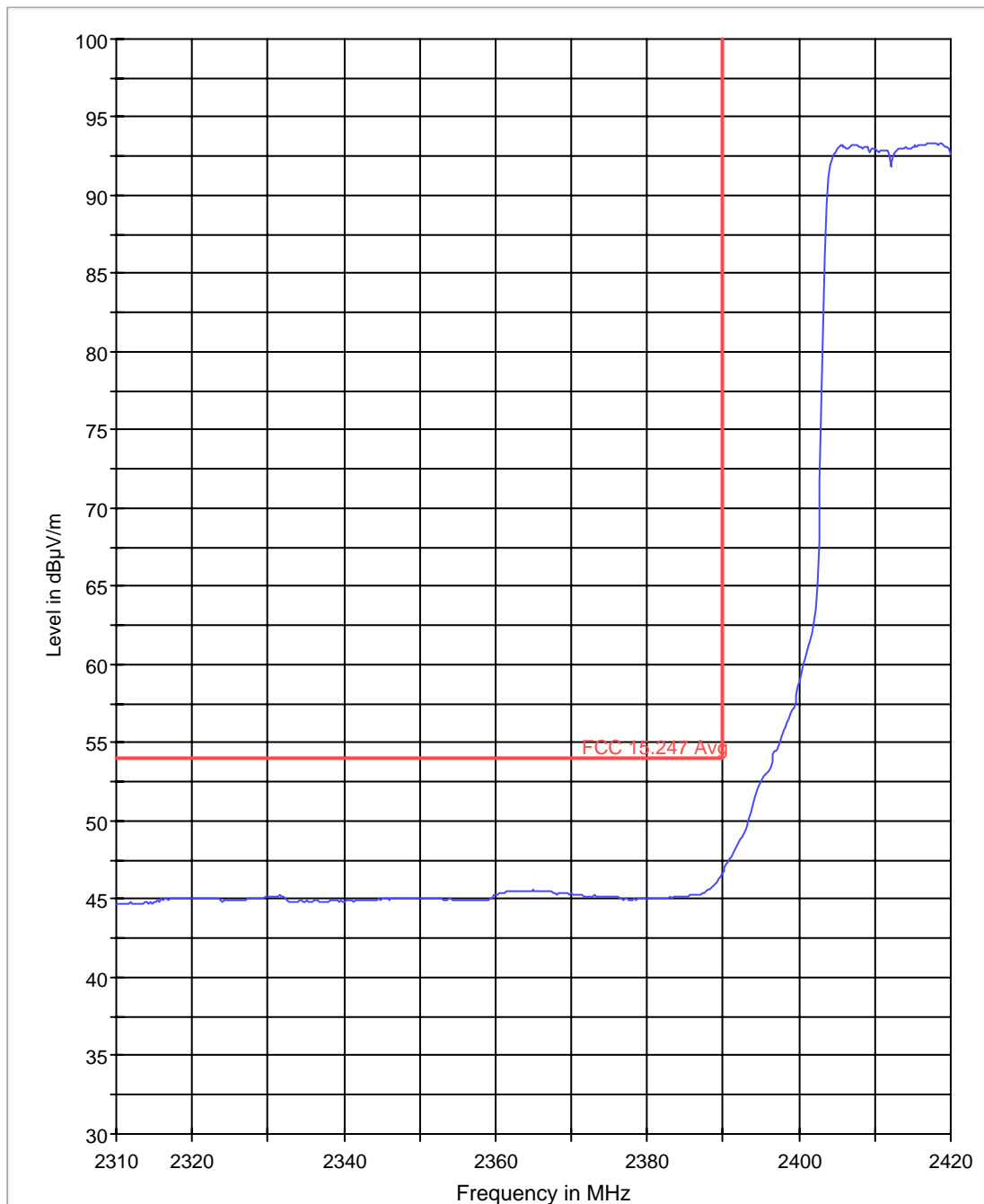
5.2.3 Sub-band 1 802.11g Lower band edge PEAK

FCC 15.247 LBE Pk 3m



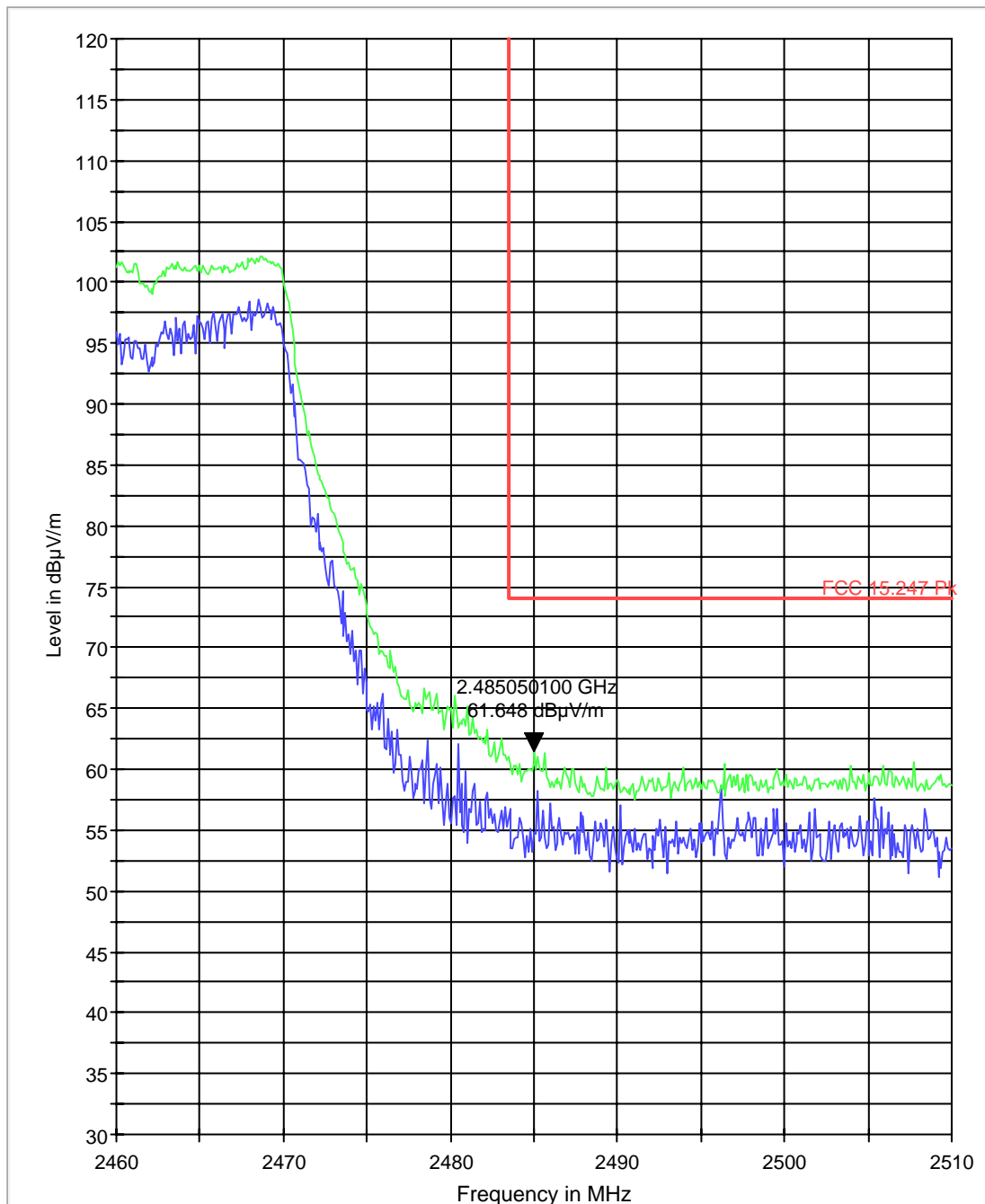
Lower band edge Average

FCC 15.247 LBE Avg 3m



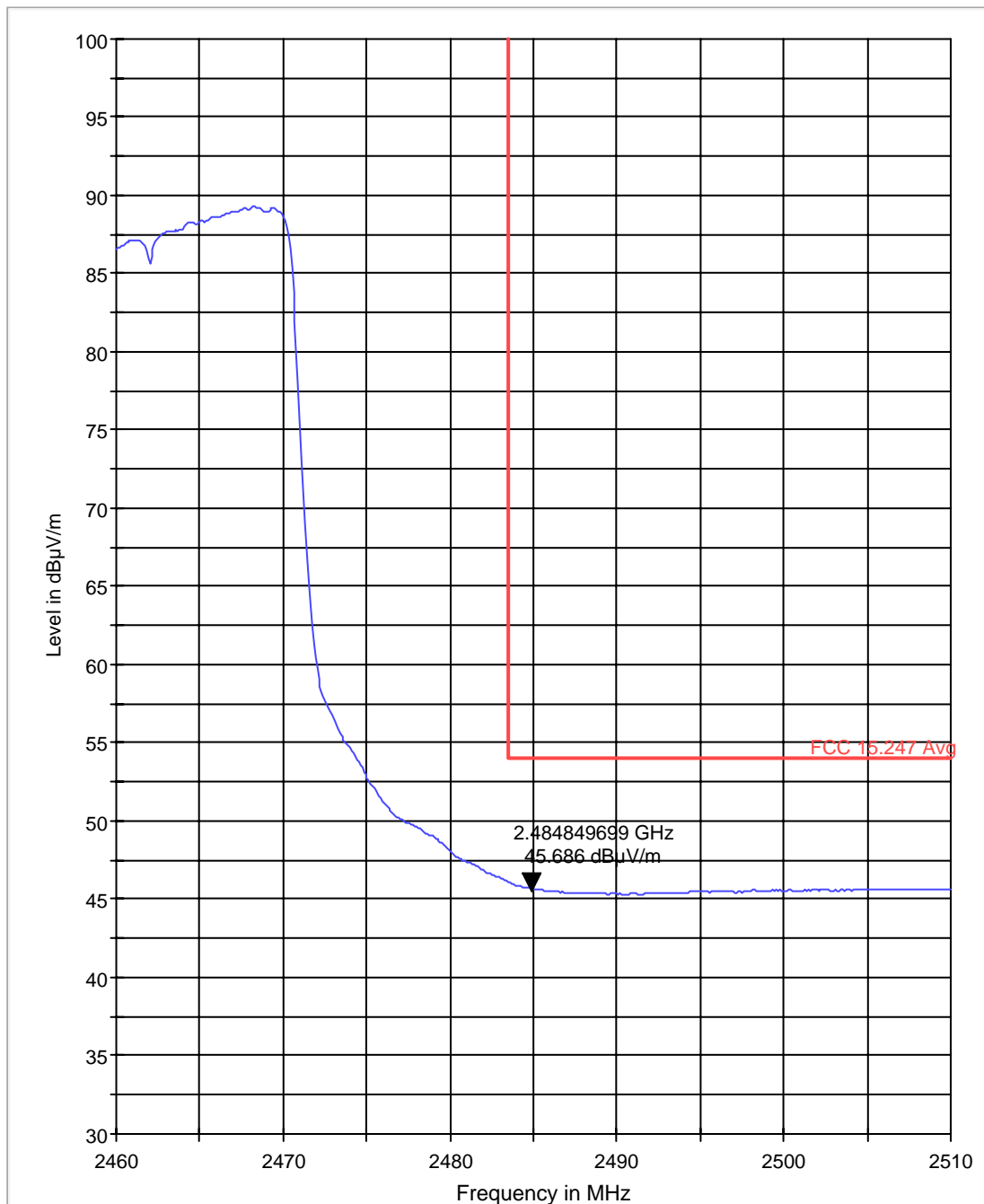
High band edge PEAK

FCC 15.247 HBE Pk 3m



High band edge Average

FCC 15.247 HBE Avg 3m



5.3 Transmitter Spurious Emission § 15.247/15.205/15.209

5.3.1 Limits

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

*PEAK LIMIT= 74dB μ V/m

*AVG. LIMIT= 54dB μ V/m

Notes:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.
2. All measurements are done in peak mode using an average limit, unless specified with the plots.
3. Radiated emissions are maximized by rotating the EUT 360° at 0.5 meter height increments between 1 and 4 meters.
4. Measurements were performed with the EUT in X, Y and Z orientations with the measurement antenna in both horizontal and vertical polarity. The plots below show the results of the worst case orientation and polarity

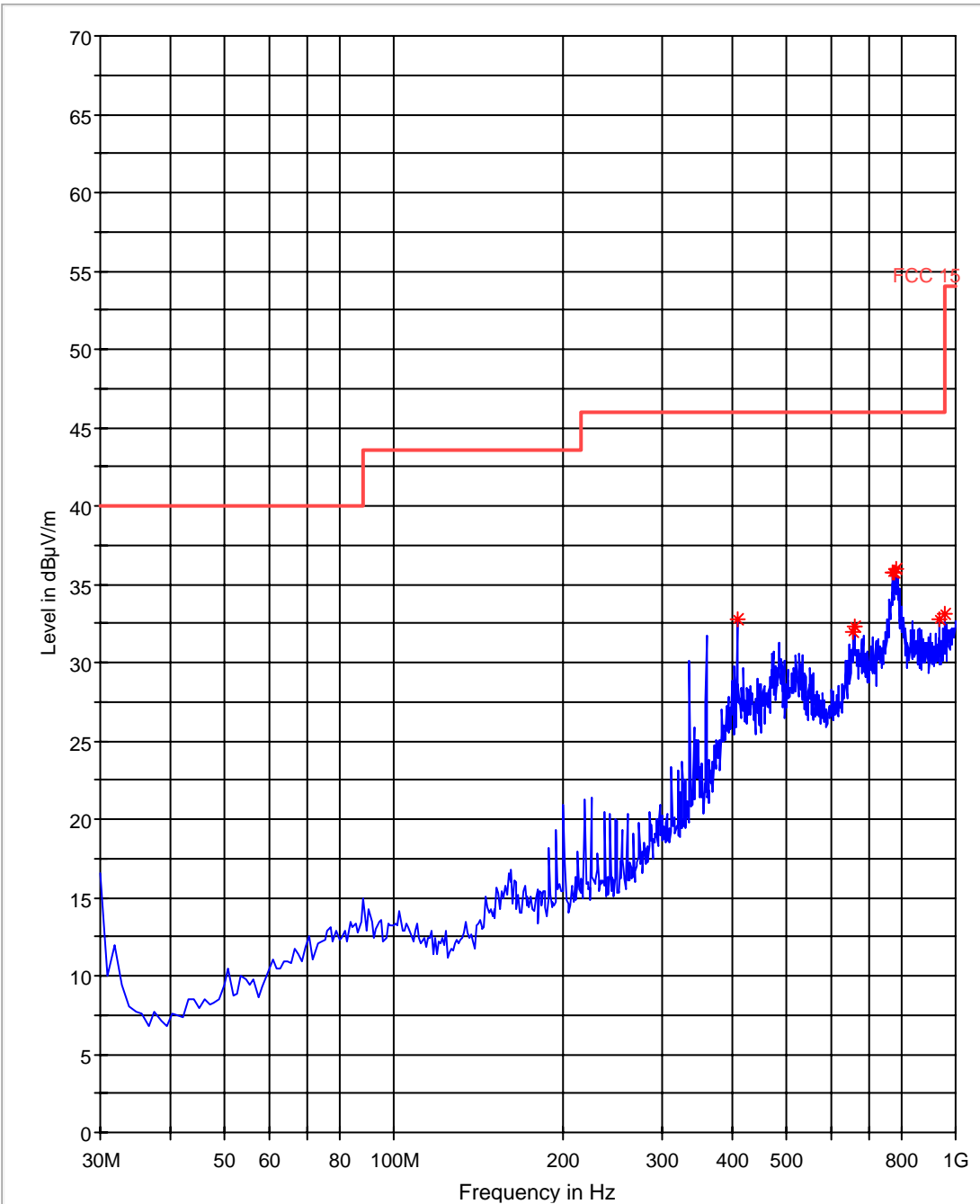
Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels

5.3.2 RESULTS Sub-band 1 802.11b/g MODE:

**Emissions reported here are worse cases emissions for all operation modes.
30MHz – 1GHz, Worst case for all channels**

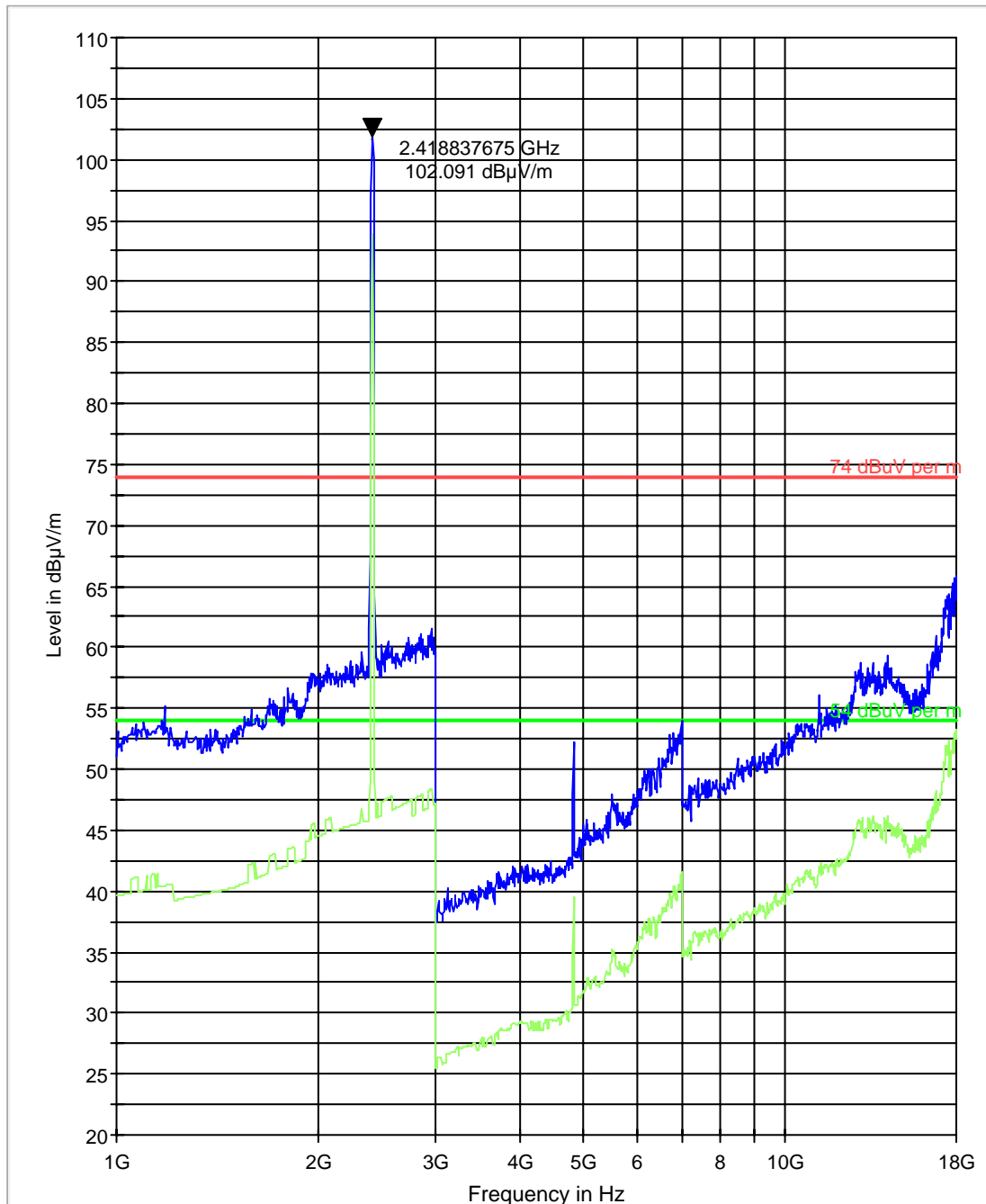
FCC 15 30-1000MHz



1-18GHz Channel 1

Note: The peak above the limit line is the carrier freq.

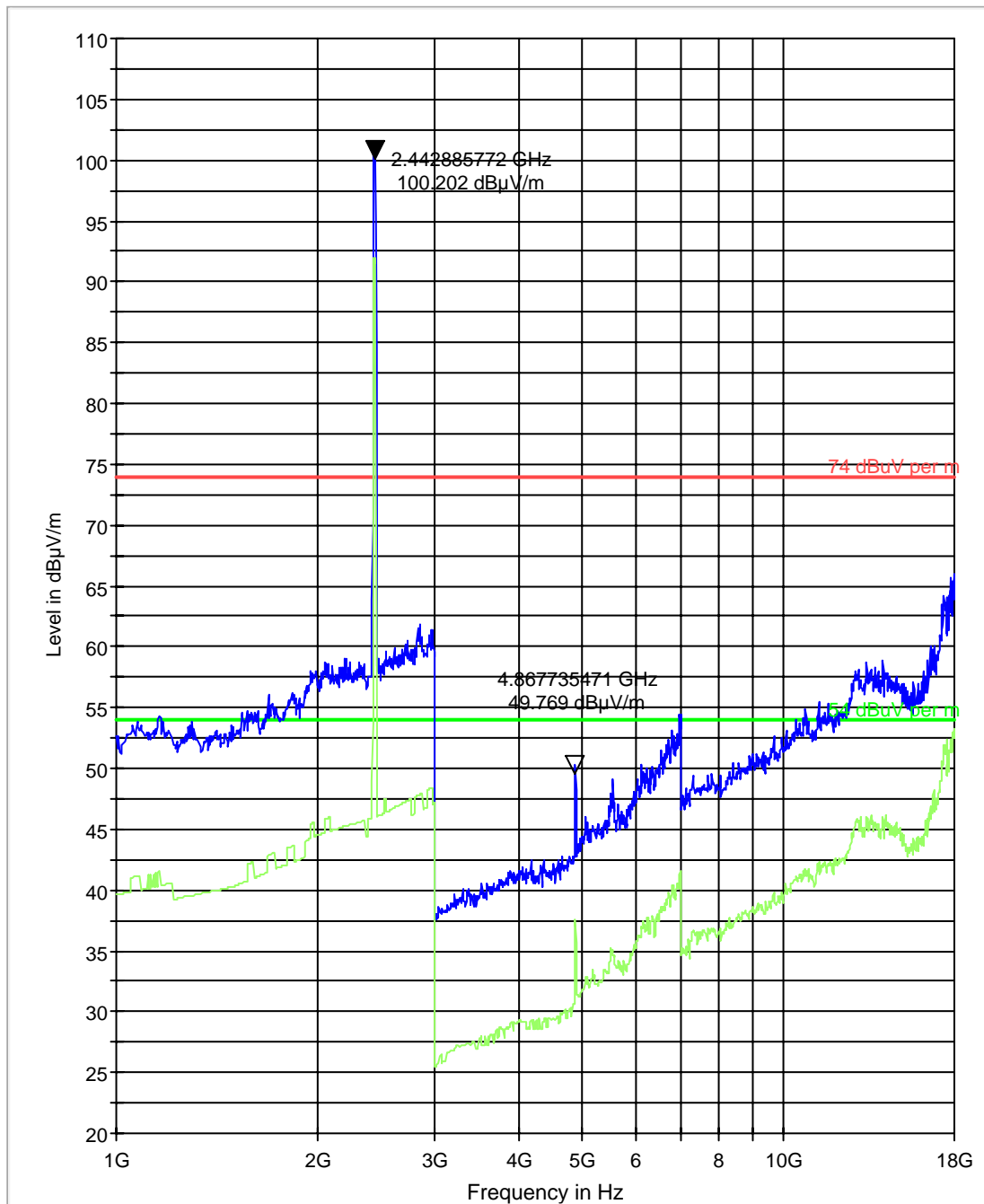
FCC 15 1-18GHz



1-18GHz Channel 6

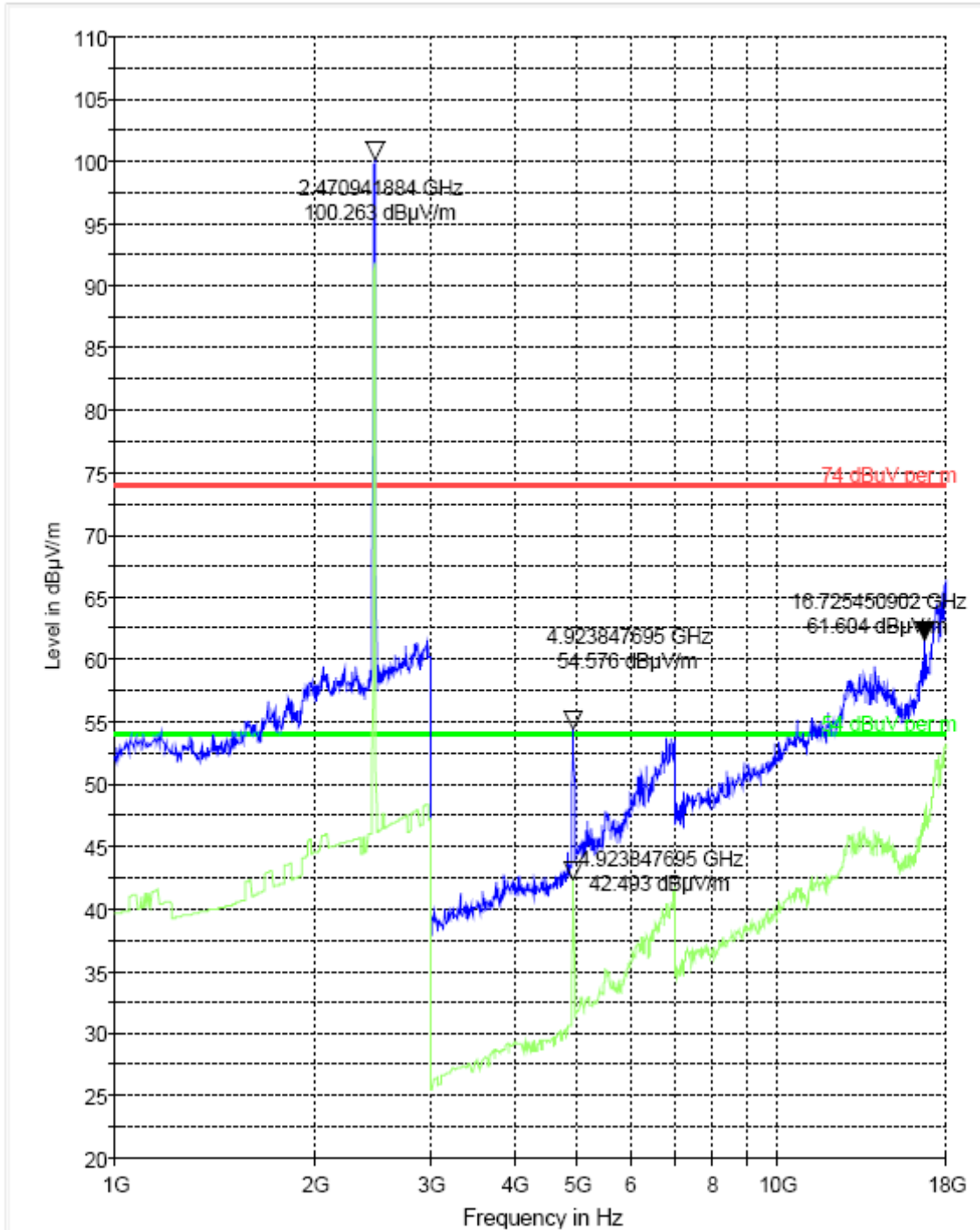
Note: The peak above the limit line is the carrier freq.

FCC 15 1-18GHz



1-18GHz Channel 11

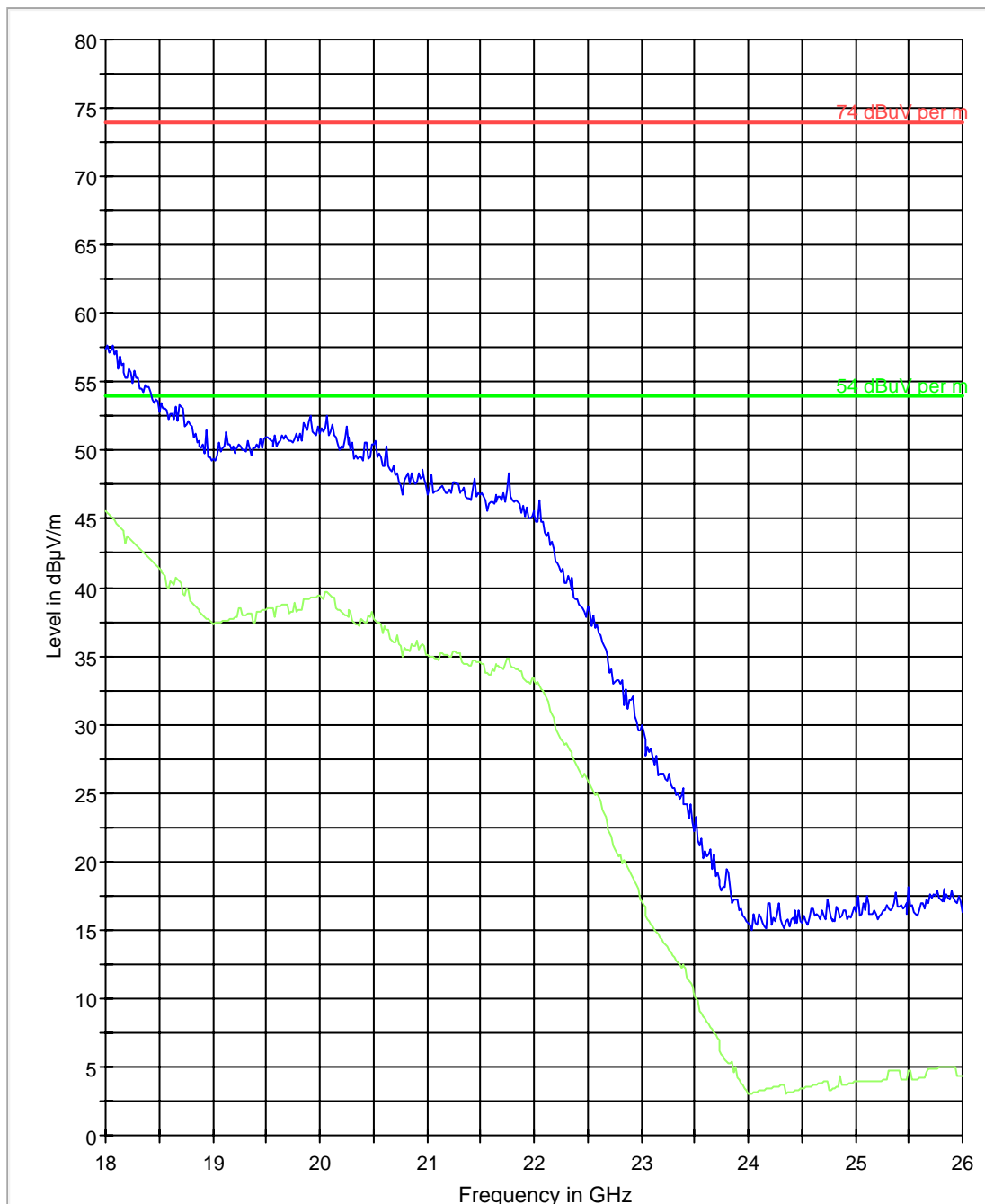
Note: The peak above the limit line is the carrier freq.



18-26.5GHz

Note: This plot is valid for low, mid, high channels (worst-case plot).

FCC 15 18-26GHz



5.4 Receiver Spurious Emission § 15.209/RSS210

5.4.1 Limits

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

NOTE:

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.
2. All measurements are done in peak mode using an average limit unless specified with the plots.
3. There are no measurable emissions up to 18GHz in Rx mode.
4. Receiver spurious emissions reported here are the worse case emissions for all receiver modes and between two receiving chains.

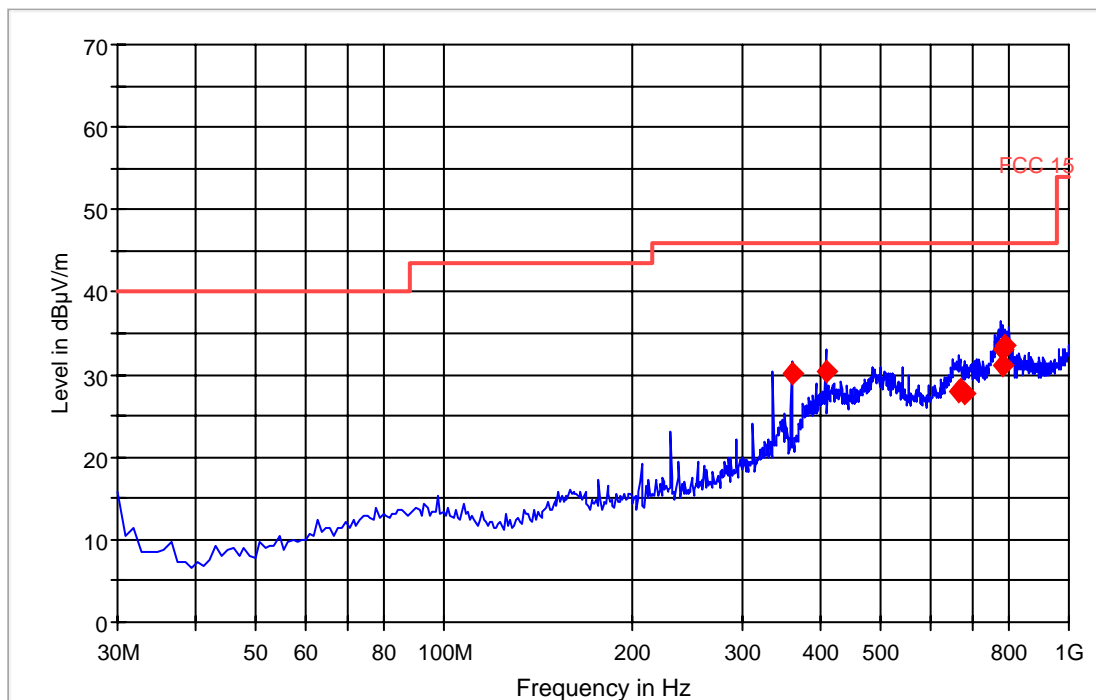
5.4.2 RESULTS

30MHz – 1GHz

Note: This plot is valid for low, mid, high channels (worst-case plot).

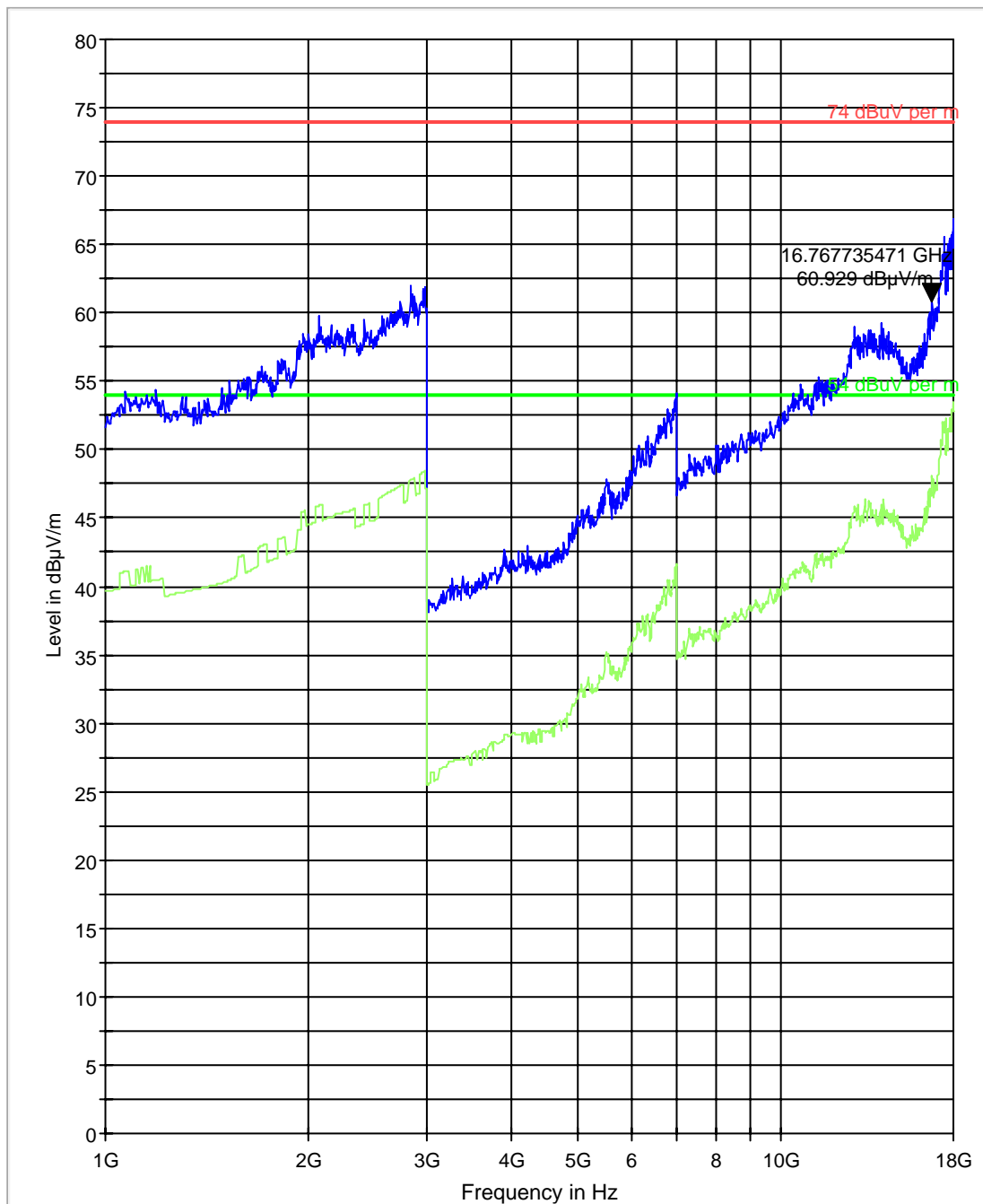
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
360.041152	30.2	20.0	120.000	151.0	V	160.0	16.9	15.8	46.0
408.043560	30.4	20.0	120.000	120.0	V	0.0	17.9	15.6	46.0
665.082630	27.9	20.0	120.000	120.0	H	70.0	23.9	18.1	46.0
670.430712	28.1	20.0	120.000	120.0	H	80.0	24.1	17.9	46.0
679.576327	27.7	20.0	120.000	120.0	H	69.0	24.3	18.3	46.0
782.821260	31.1	20.0	120.000	120.0	V	24.0	24.5	14.9	46.0
785.151513	33.1	20.0	120.000	143.0	V	0.0	24.5	12.9	46.0
788.912124	33.4	20.0	120.000	142.0	V	0.0	24.6	12.6	46.0

FCC 15 30-1000MHz



1-18GHz

FCC 15 1-18GHz

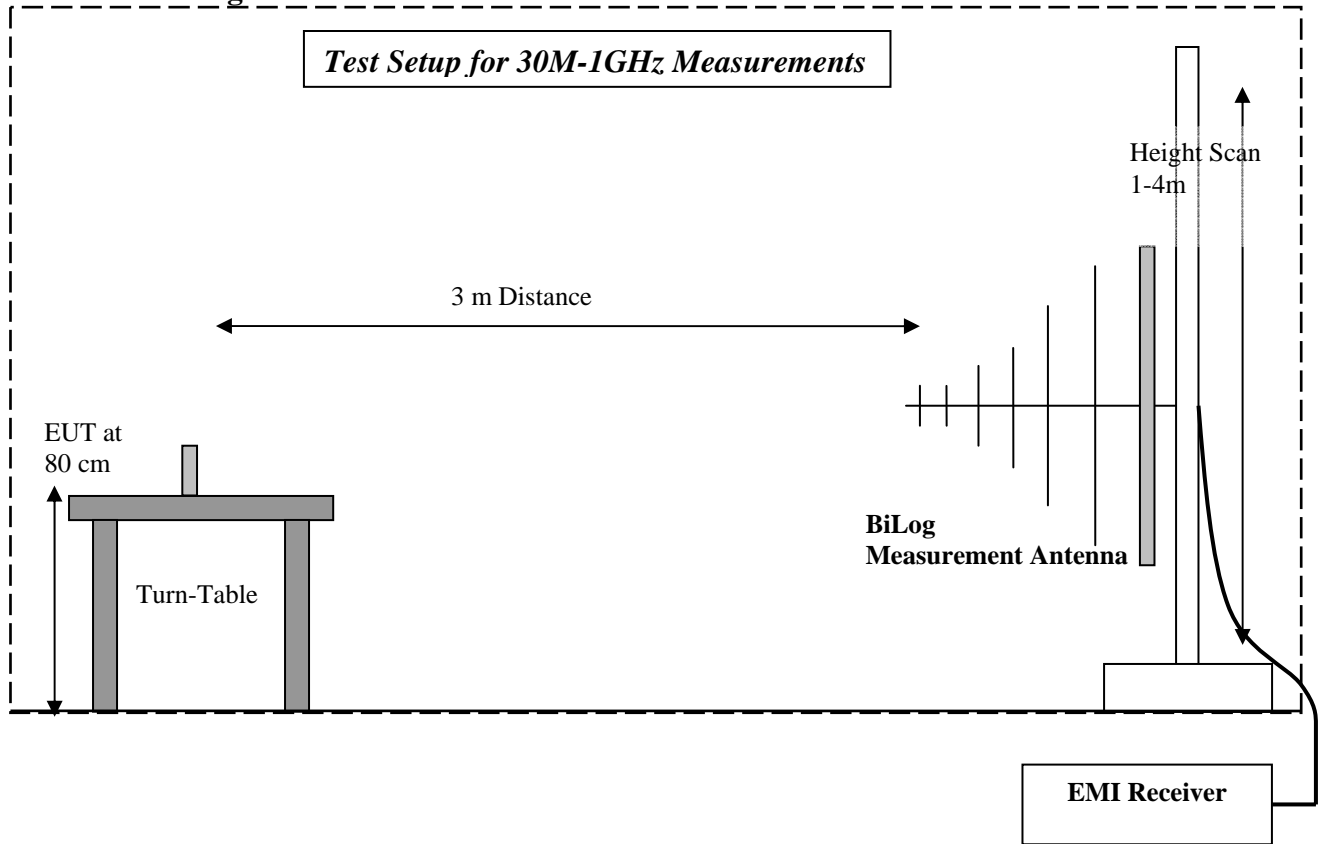


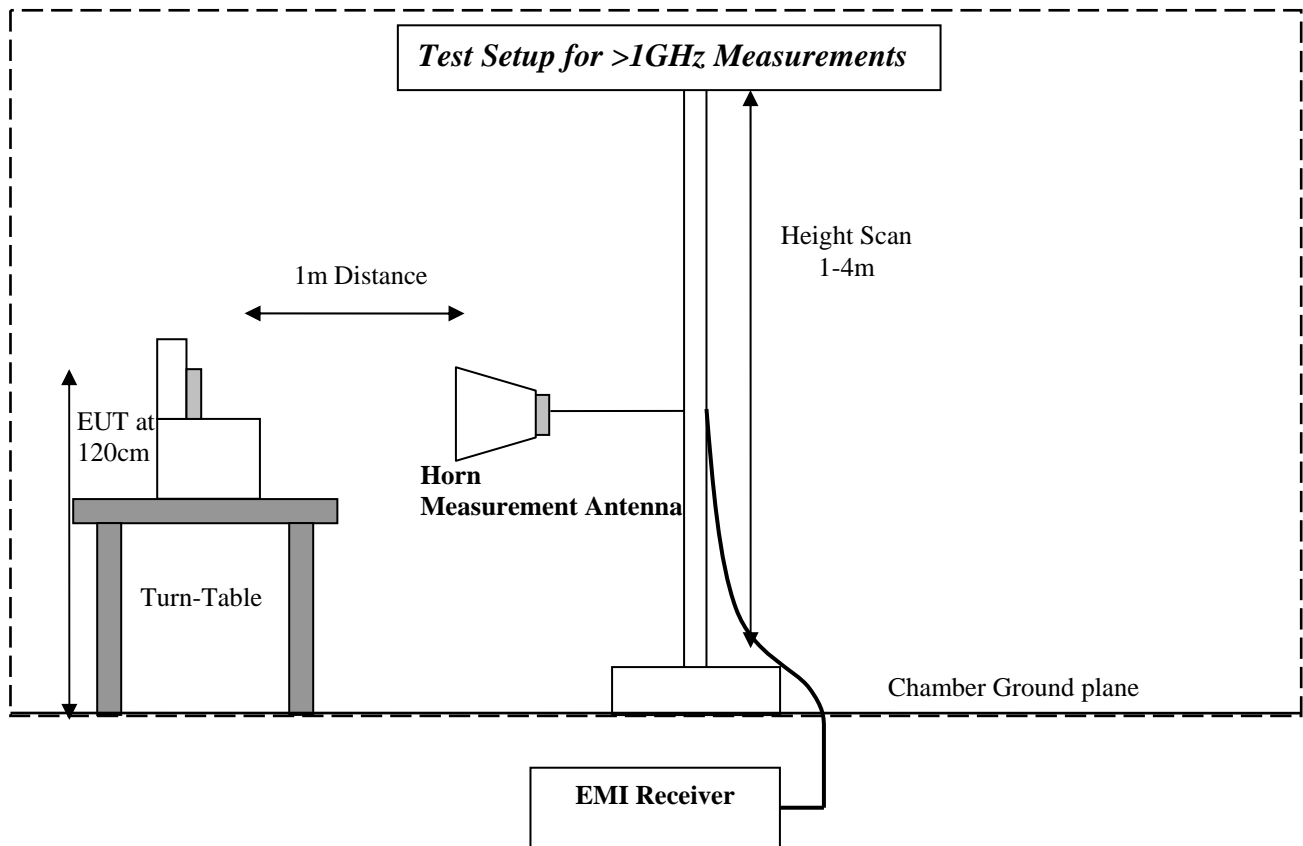
6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2010	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2010	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2010	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2010	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2010	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2010	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2010	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2010	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2010	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2010	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2010	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2010	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2010	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2011	2 years

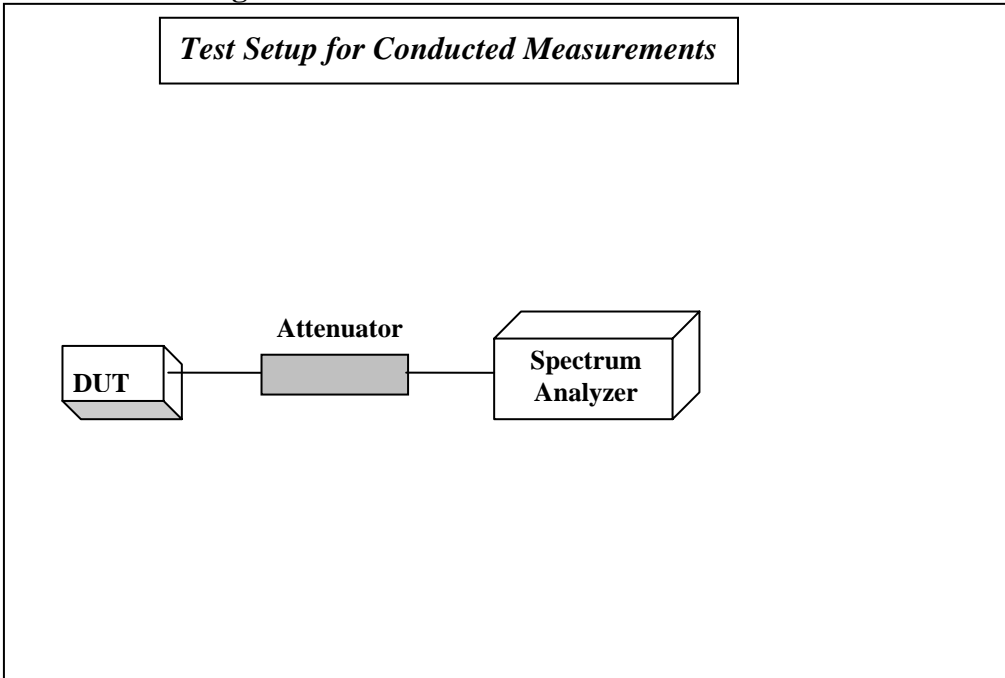
7 BLOCK DIAGRAMS

Radiated Testing





Conducted Testing



8 Revision History

2010-04-05: EMC_PSION_006_10001_15.247_WLAN
Original report

2010-04-15: EMC_PSION_006_10001_15.247_WLAN_rev1
Markers placed on peaks of spurious emission measurements on pages 21 and 25.