

CETECOM Inc.



CETECOM Inc.

411 Dixon Landing Road, Milpitas, CA-95035, USA

Phone: +1 408 586 6200 Fax: +1 408 586 6299

www.cetecom.com

Issued test report consists of 58 Pages

FCC LISTED, REG. NO.: 101450 & RECOGNIZED BY INDUSTRY CANADA IC – 3925

Test report no.:177 FCC/2001

FCC Part 15.247

LAN AP - LW1100AP

(FCC ID:FFMLW1100AP)

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The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalisations 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.

1.2 Testing laboratory**CETECOM Inc.**

411 Dixon Landing Road, Milpitas, CA-95035, USA

Phone: +1 408 586 6200 Fax: +1 408 586 6299

E-mail: lothar.schmidt@cetecomusa.com

Internet: www.cetecom.com

1.3 Details of applicant**Name** : LG Electronics Inc.**Street** : 60-39 Kasan-dong, Kumchon-gu**City** : Seoul 153-023**Country** : Korea**Telephone** : +82 2 3289 3117**Telefax** : +82 2 3289 3200**Contact** : Mr. William KS. Oh**e-mail** : ksoh@lge.com**1.4 Application details**

Date of receipt of application : 2001-08-01

Date of receipt of test item : 2001-08-03

Date of test : 2001-08-08/09

1.5 Test item

Manufacturer : LG Electronics Inc.

Address : See above

Name of EUT : Access Point

Descriptin : LAN Access Point

Model No. : LW1100AP

FCC ID :

Additional informations:

Frequency : 2412 – 2462 MHz

Type of modulation : DBPSK, DQPSK, CCK

Number of channels : 11 Channels in US

Antenna : Internal

Power supply : +5VDC

Temperature range : -10°C - +55°C

1.6 Test standards FCC Part 15 §15.247

The tests were done following the public notice DA 00-705 released March 30, 2000

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

TEST REPORT PREPARED BY:
EMC & Radio Engineer:

Harpreet Sidhu

Technical responsibility for area of testing :

2001-08-14 EMC & Radio Lothar Schmidt



Date	Section	Name	Signature
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2.2 Testreport

TEST REPORT

Testreport no. : 177 FCC/2001

LAN AP - LW1100AP

FCC ID:

TEST REPORT REFERENCE**LIST OF MEASUREMENTS**

Paragraph	PARAMETER TO BE MEASURED	PAGE
	Transmitter parameters	
§ 15.247 (a)(2)	Spectrum Bandwith of a DSSS System	7
§ 15.247 (b)(1)	Maximum peak output power	11
§ 15.247 (c)(1)	Emission limitations	19
§ 15.247 (d)	Power Spectral Density	33
§ 15.247 (e)	Processing Gain of DSSS System	37
§ 15.107	Conducted emissions	40
	Receiver parameters	
§ 15.209	Receiver Spurious Radiation	42
	Test equipment listing	50
	Test Site	51
	Photographs of the equipment	53

SPECTRUM BANDWITH OF DSSS-SYSTEM

SUBCLAUSE § 15.247 (a)(2)

TEST CONDITIONS		6 dB BANDWIDTH (kHz)		
Frequency (MHz)		2412	2437	2462
T _{nom} (23)°C	V _{nom} (5.0)V	11122	11122	11122
Measurement uncertainty		±3dB		

LIMIT

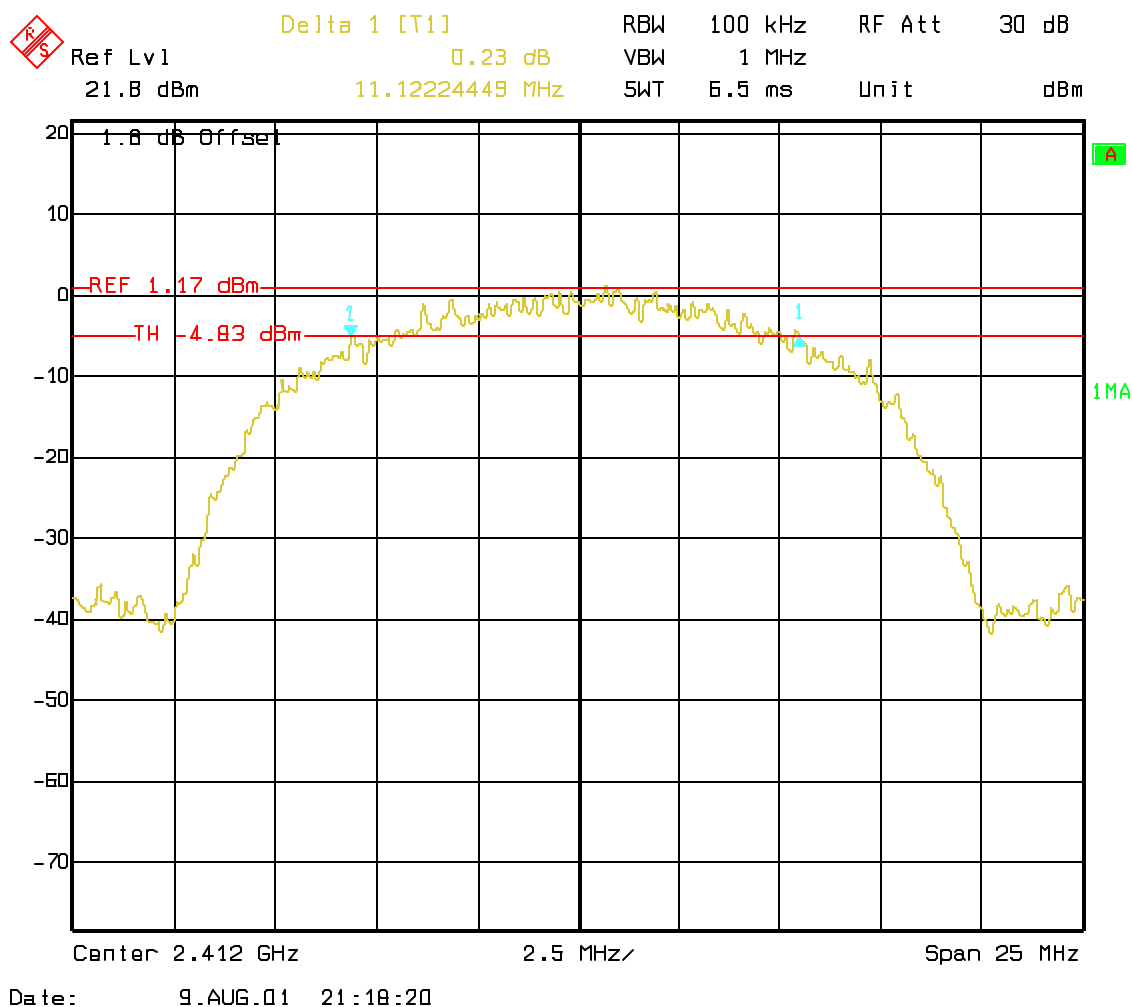
SUBCLAUSE §15.247(a) (2)

The minimum 6dB bandwidth shall be at least 500 KHz

SPECTRUM BANDWITH OF DSSS-SYSTEM

SUBCLAUSE § 15.247 (a)(2)

Lowest Channel: 2412 MHz



LIMIT

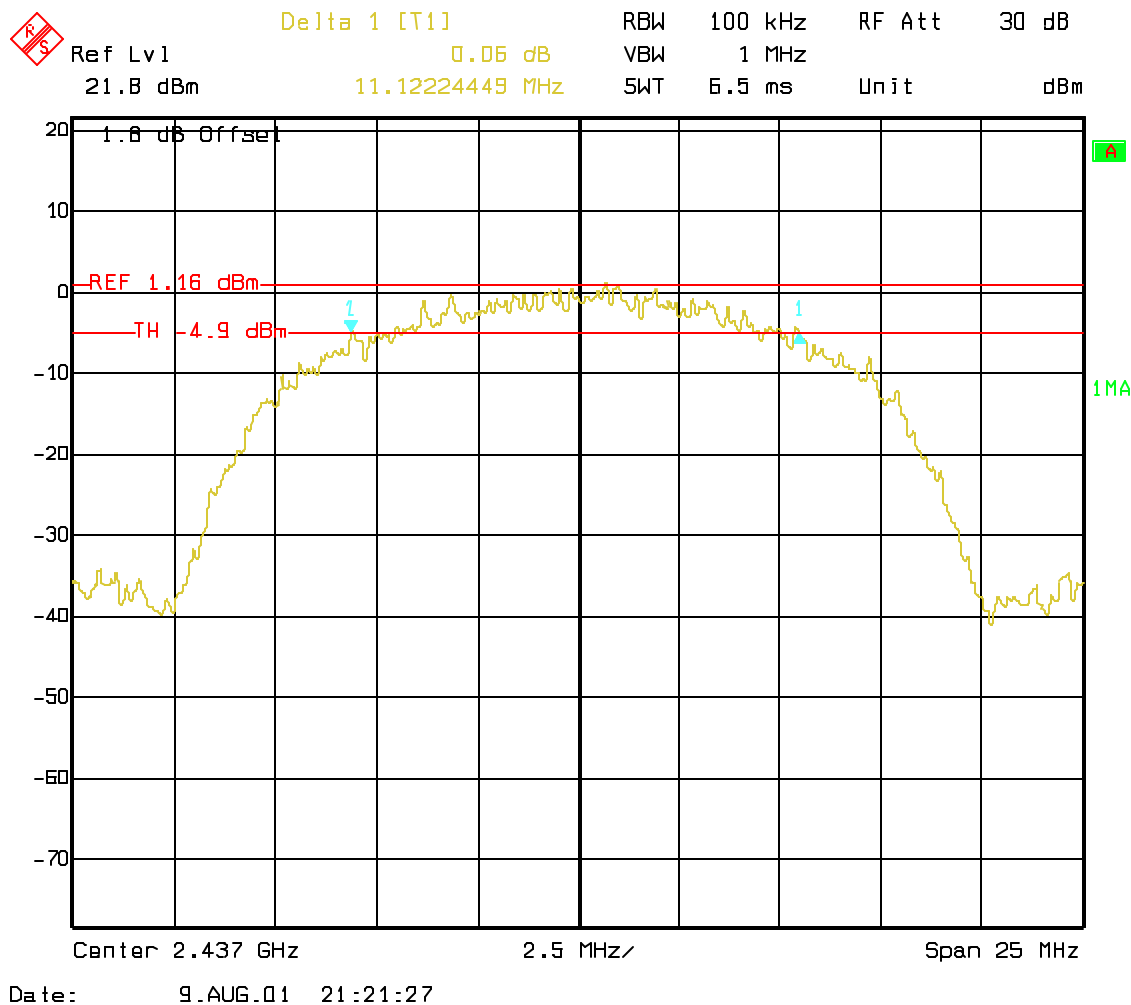
SUBCLAUSE §15.247(a) (2)

The minimum 6dB bandwidth shall be at least 500 KHz , here 11.122 MHz

SPECTRUM BANDWITH OF DSSS-SYSTEM

SUBCLAUSE § 15.247 (a)(2)

Mid Channel: 2437 MHz

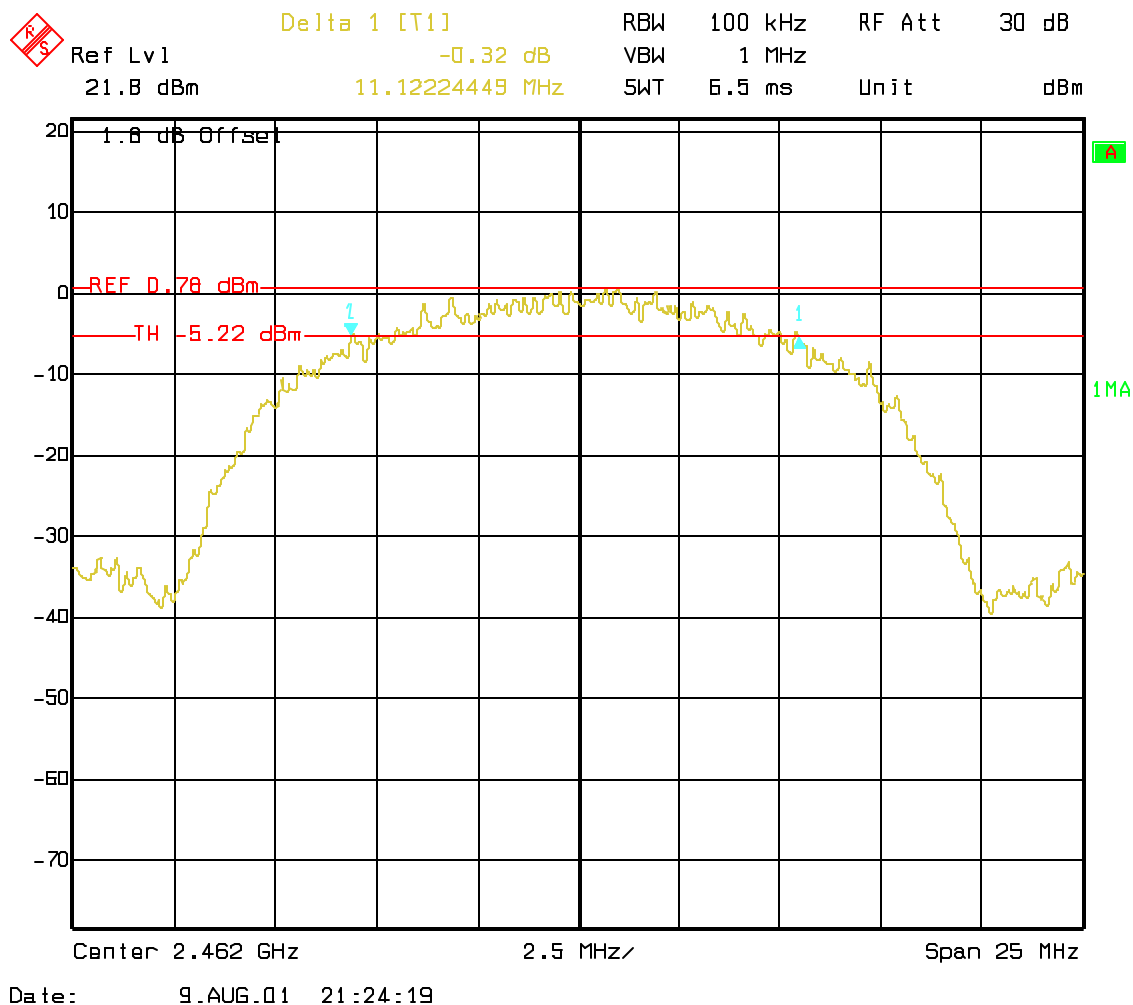


LIMIT

SUBCLAUSE §15.247(a) (2)

The minimum 6dB bandwidth shall be at least 500 KHz , here 11.122 MHz

Highest Channel: 2462 MHz



SUBCLAUSE §15.247(a) (2)

The minimum 6dB bandwidth shall be at least 500 KHz , here 11.122 MHz

**MAXIMUM PEAK OUTPUT POWER
(CONDUCTED)**

SUBCLAUSE § 15.247 (b) (1)

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)					
Frequency (MHz)		2412		2437		2462	
T _{nom} (23)° C	V _{nom} (5.0)V	Pk	11.69	Pk	11.67	Pk	11.25
		Av	6.56	Av	6.68	Av	6.28
Measurement uncertainty		±3dB					

LIMIT

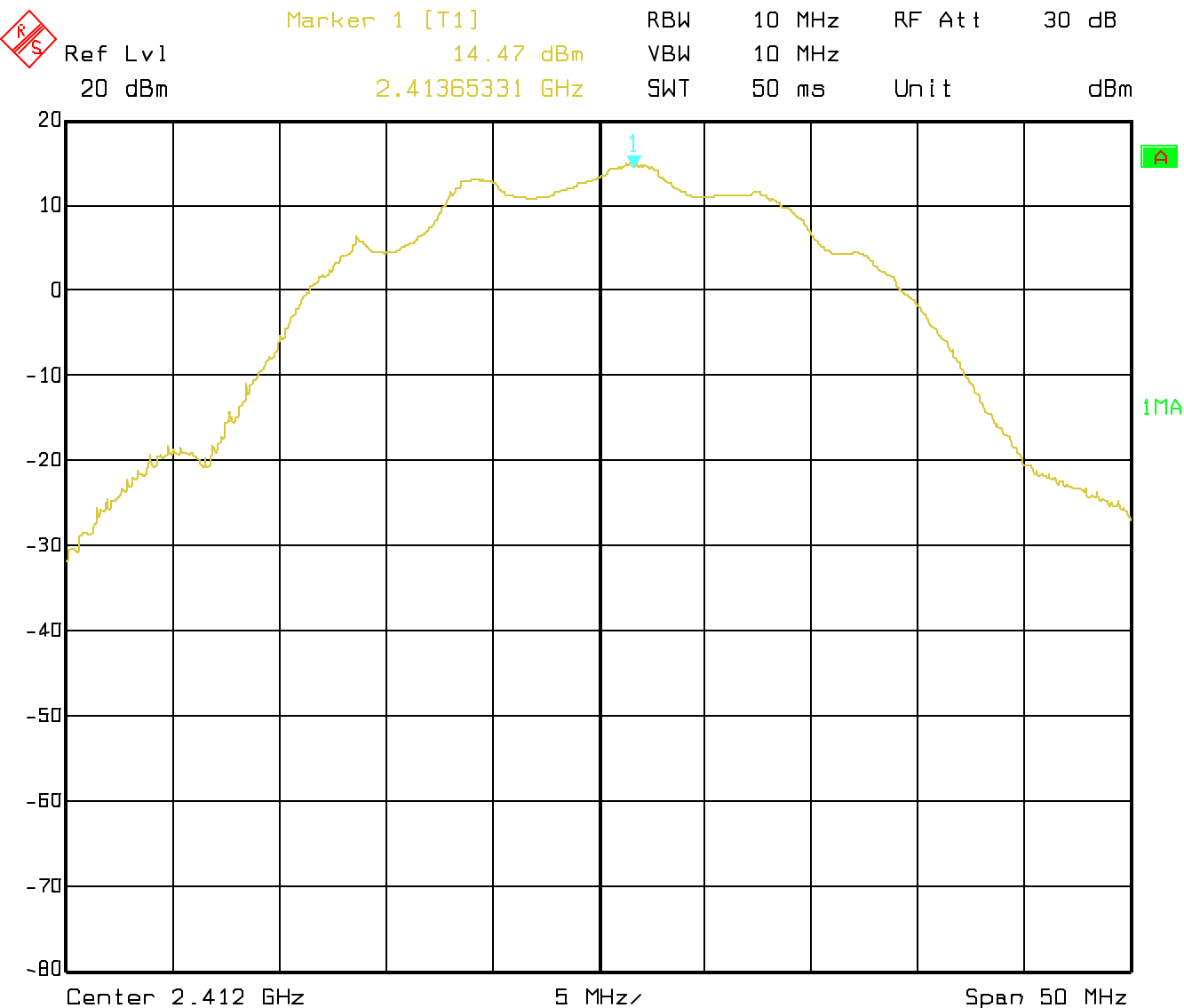
SUBCLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz / 5725 – 5850 MHz	1.0 Watt

MAXIMUM PEAK OUTPUT POWER (CONDUCTED)

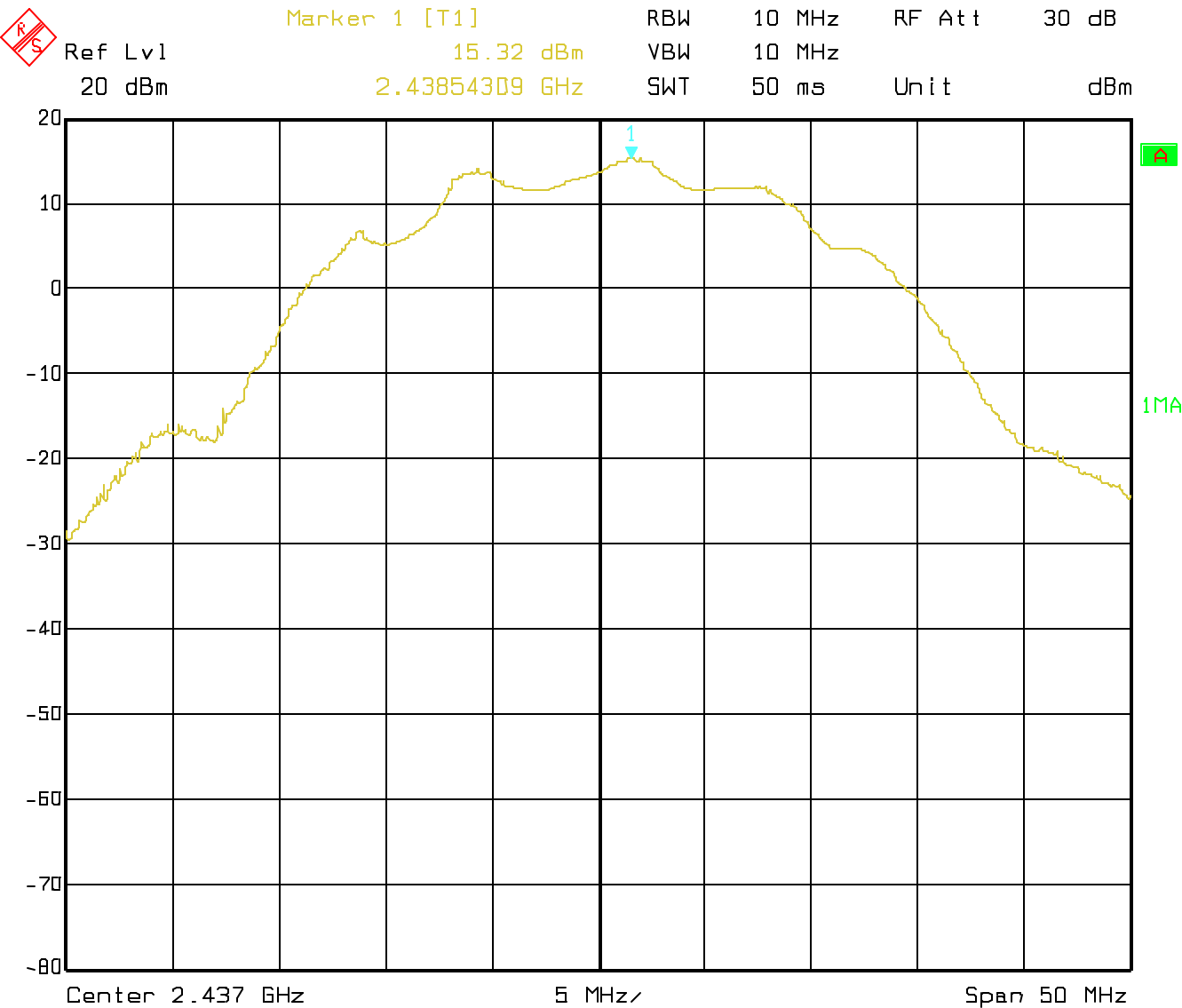
Lowest Channel: 2412 MHz

The RBW was set to the maximum available bandwidth of the Analyzer (10MHz). This is valid for the conducted output power as well as for the EIRP measurements.



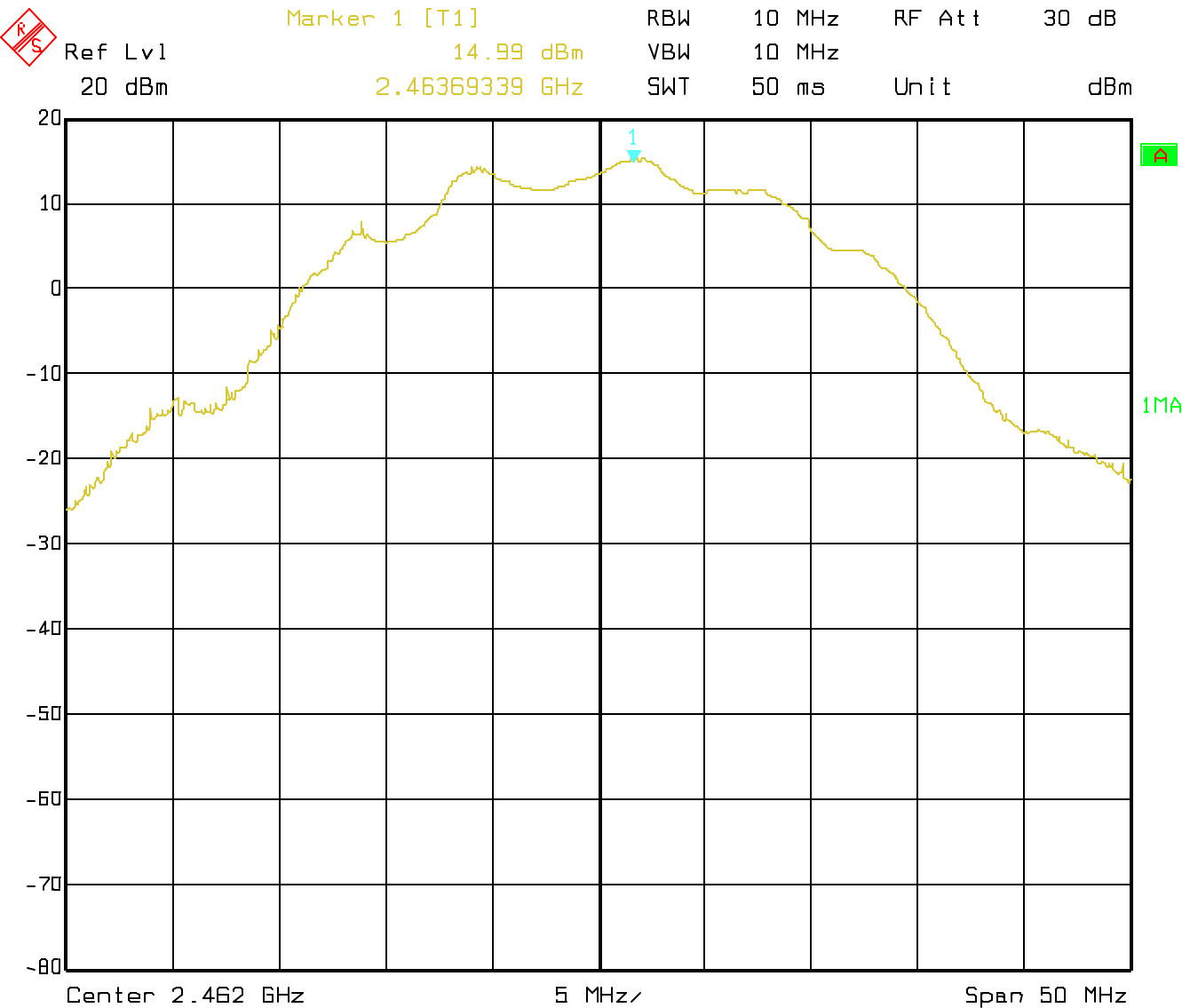
Date: 19.OCT.01 0:55:19

MAXIMUM PEAK OUTPUT POWER (CONDUCTED)
Mid Channel: 2437 MHz



Date: 19.OCT.01 0:56:31

MAXIMUM PEAK OUTPUT POWER (CONDUCTED)
Highest Channel: 2462 MHz



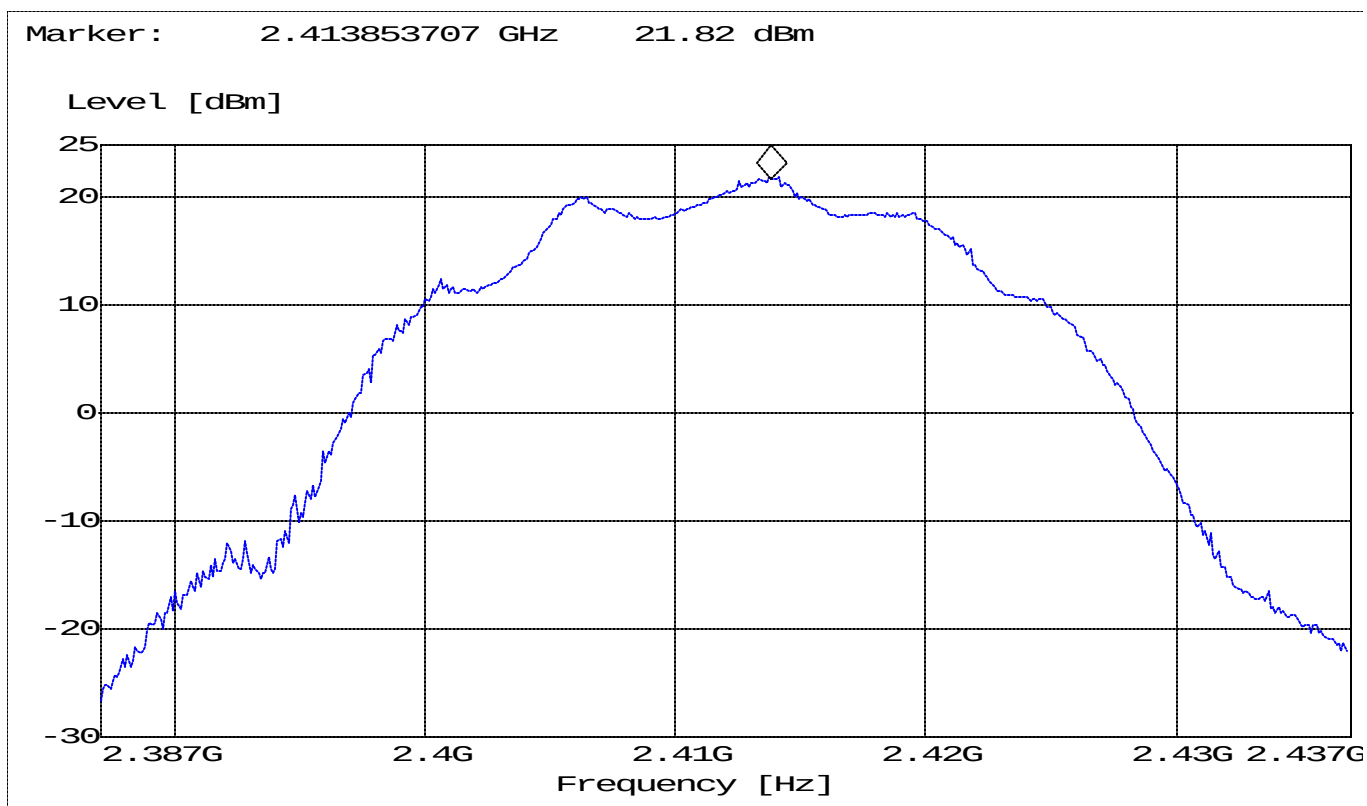
Date: 19.OCT.01 0:57:29

**MAXIMUM PEAK OUTPUT POWER (EIRP)
(RADIATED)**
SUBCLAUSE § 15.247 (b) (1)

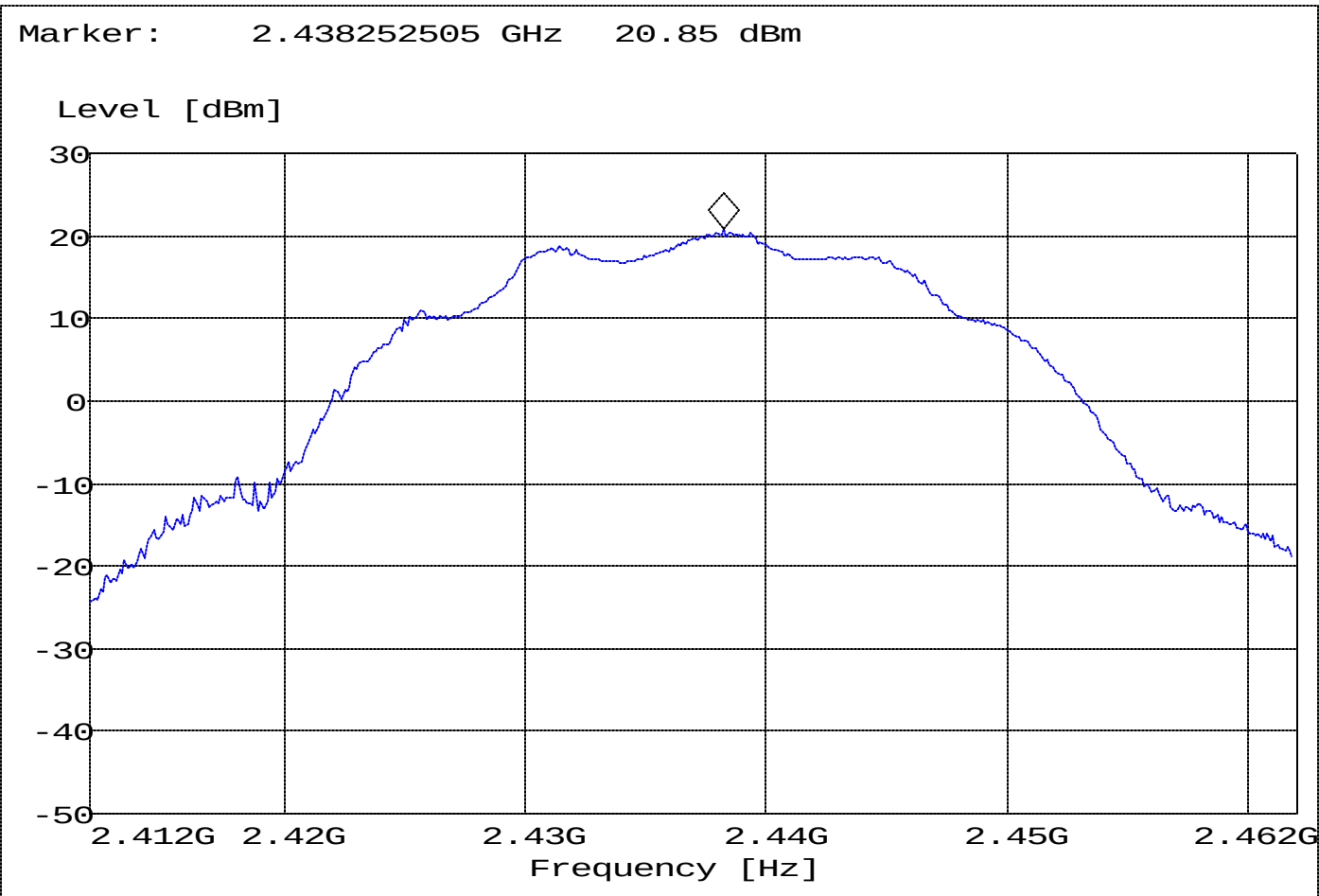
TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)					
Frequency (MHz)		2412		2437		2462	
T _{nom} (23)° C	V _{nom} (5.0)V	Pk	15.61	Pk	14.84	Pk	15.46
		Av	11.12	Av	10.09	Av	10.78
Measurement uncertainty		±3dB					

LIMIT
SUBCLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz / 5725 – 5850 MHz	1.0 Watt

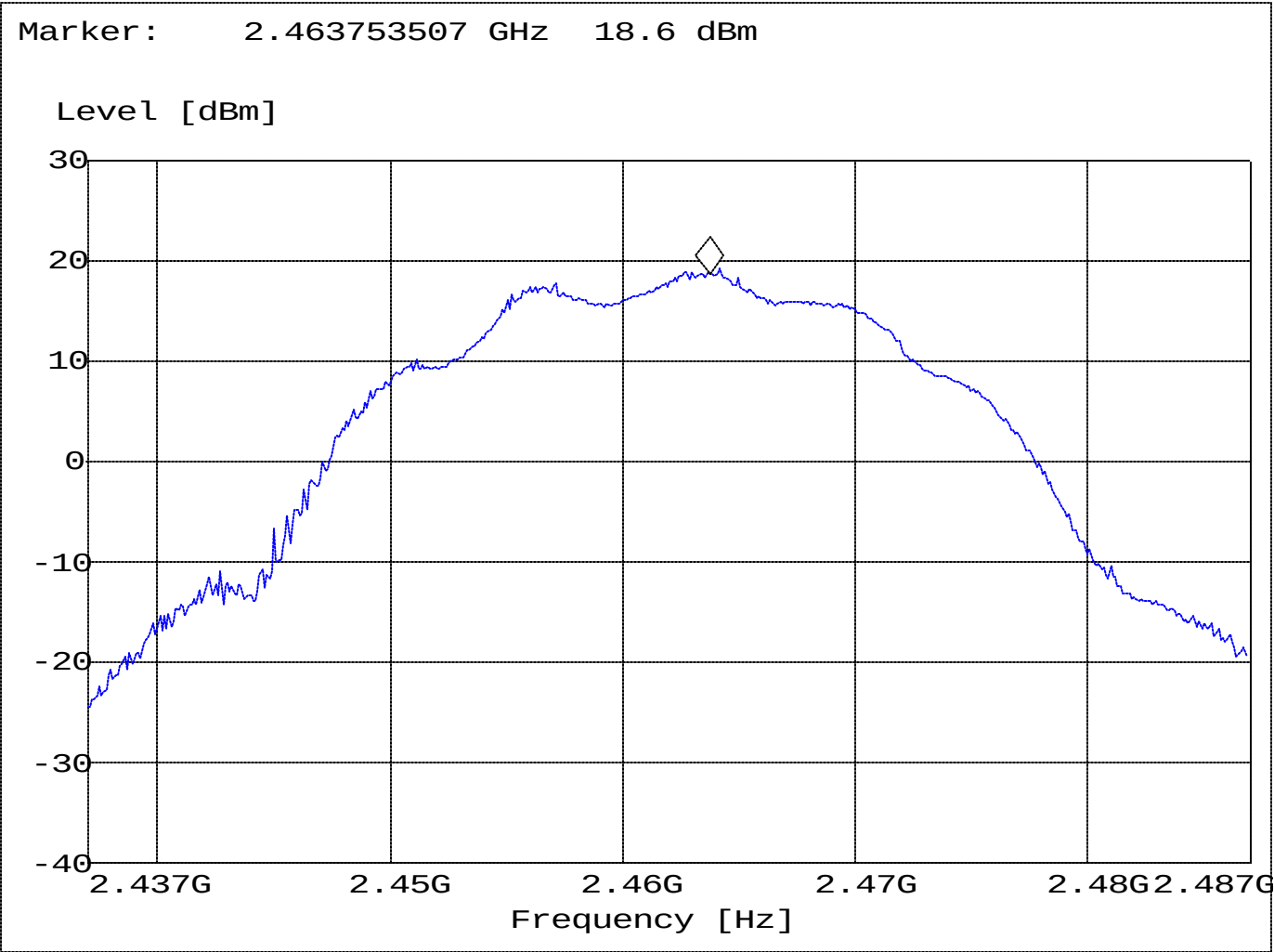
EIRP - Lowest Channel: 2412 MHz**ANALYZER SETTINGS: RBW=10MHz, VBW=10MHz**

EIRP – Mid Channel: 2437 MHz



ANALYZER SETTINGS: RBW=10MHz, VBW=10MHz

EIRP – Highest Channel: 2462 MHz

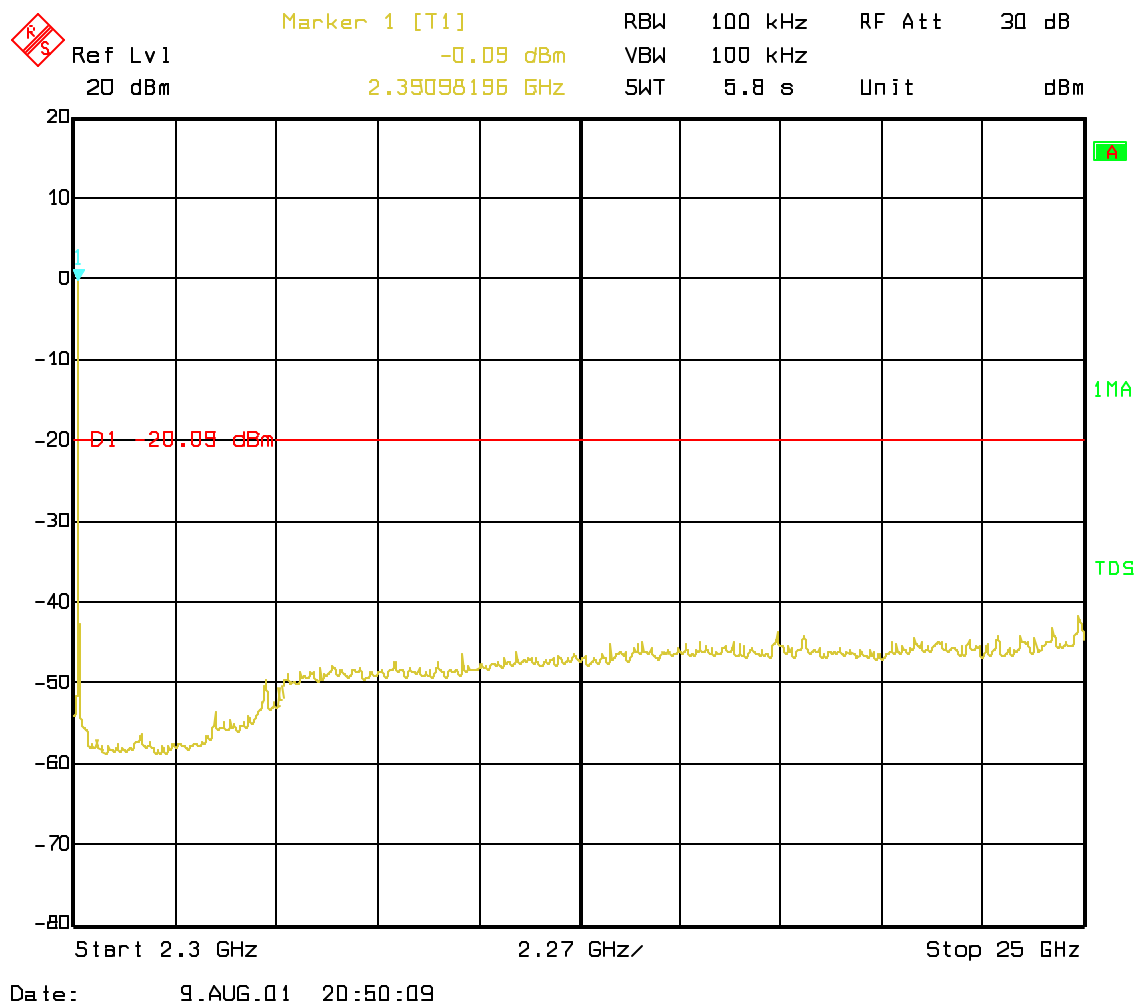


ANALYZER SETTINGS: RBW=10MHz, VBW=10MHz

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

conducted
2412 MHz up to 25 GHz



LIMITS

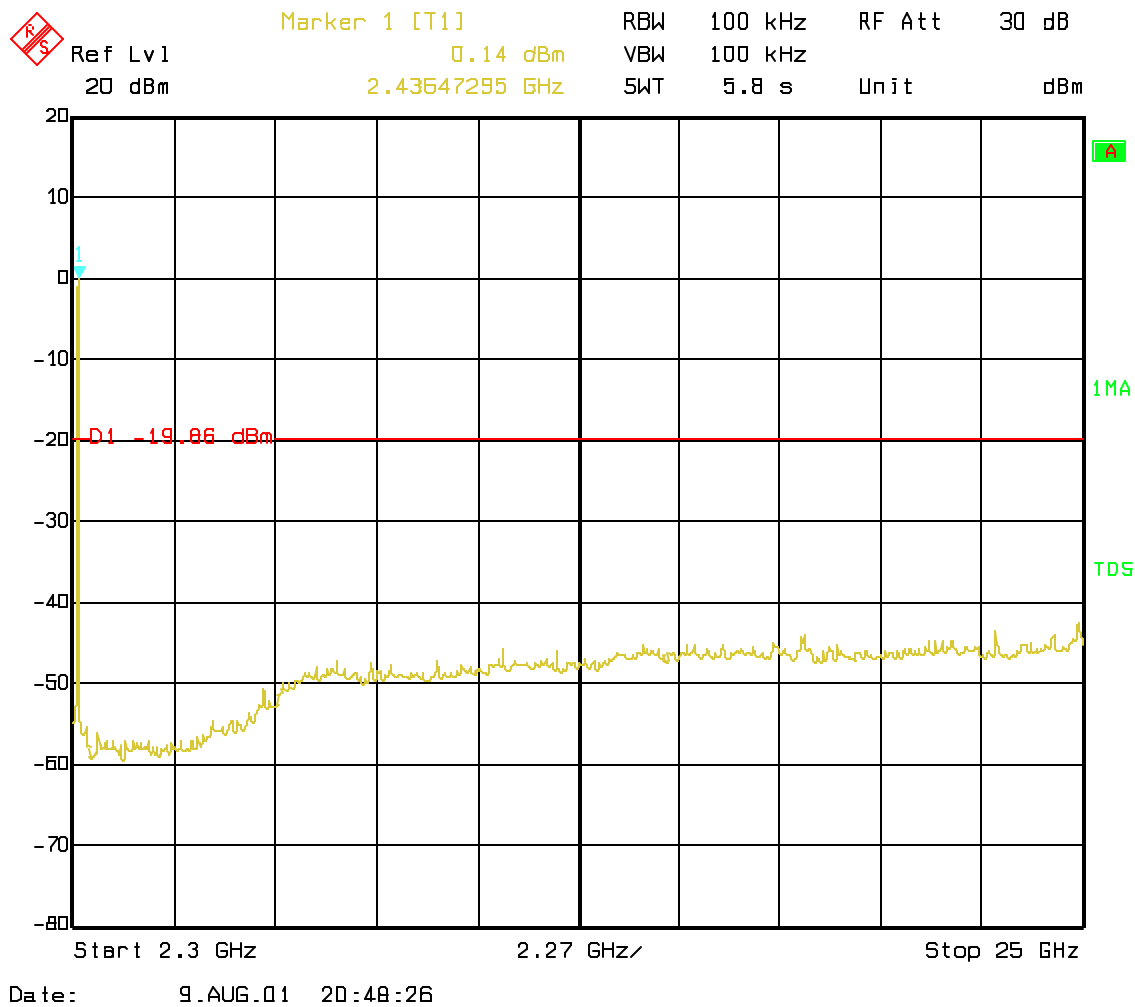
SUBCLAUSE § 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).

NOTE: The marked peak is the carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

EMISSION LIMITATIONS (Transmitter)
conducted
2437 MHz up to 25 GHz

SUBCLAUSE § 15.247 (c) (1)



LIMITS

SUBCLAUSE § 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).

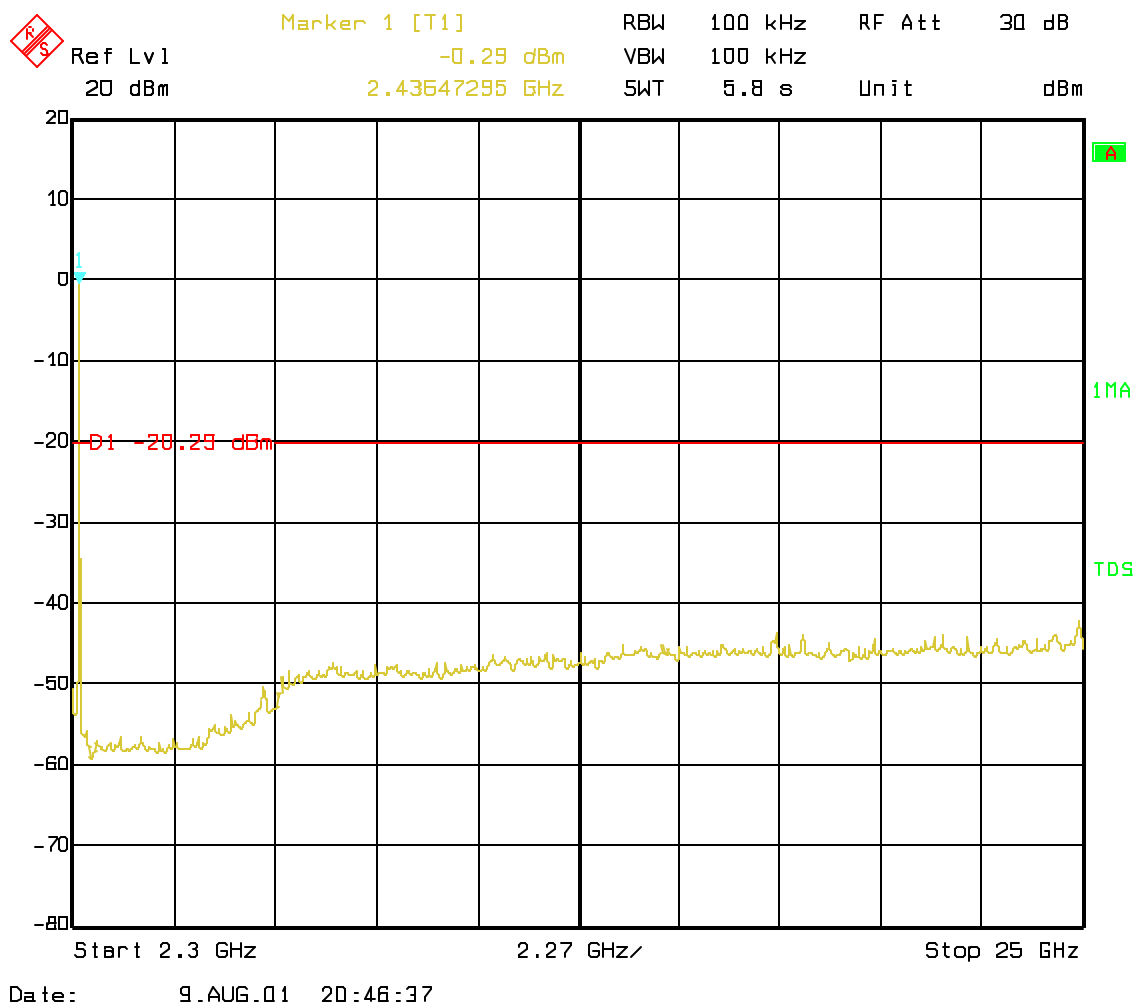
NOTE: The marked peak is the carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

conducted

2462 MHz up to 25 GHz



LIMITS

SUBCLAUSE § 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).

NOTE: The marked peak is the carrier frequency. Frequency resolution is not fine enough to show the exact

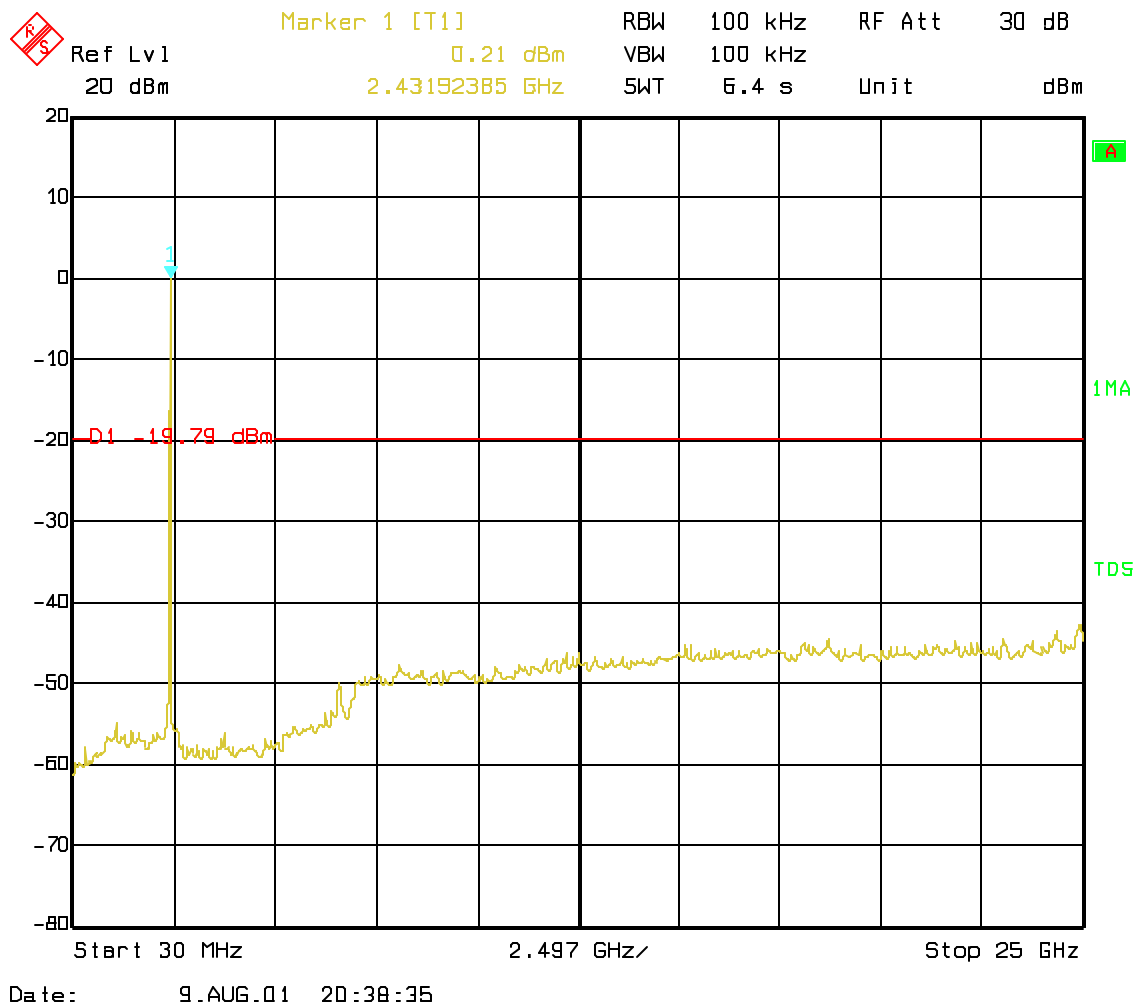
frequency of the carrier, refer to plots under EIRP.

EMISSION LIMITATIONS (Transmitter)

SUBCLAUSE § 15.247 (c) (1)

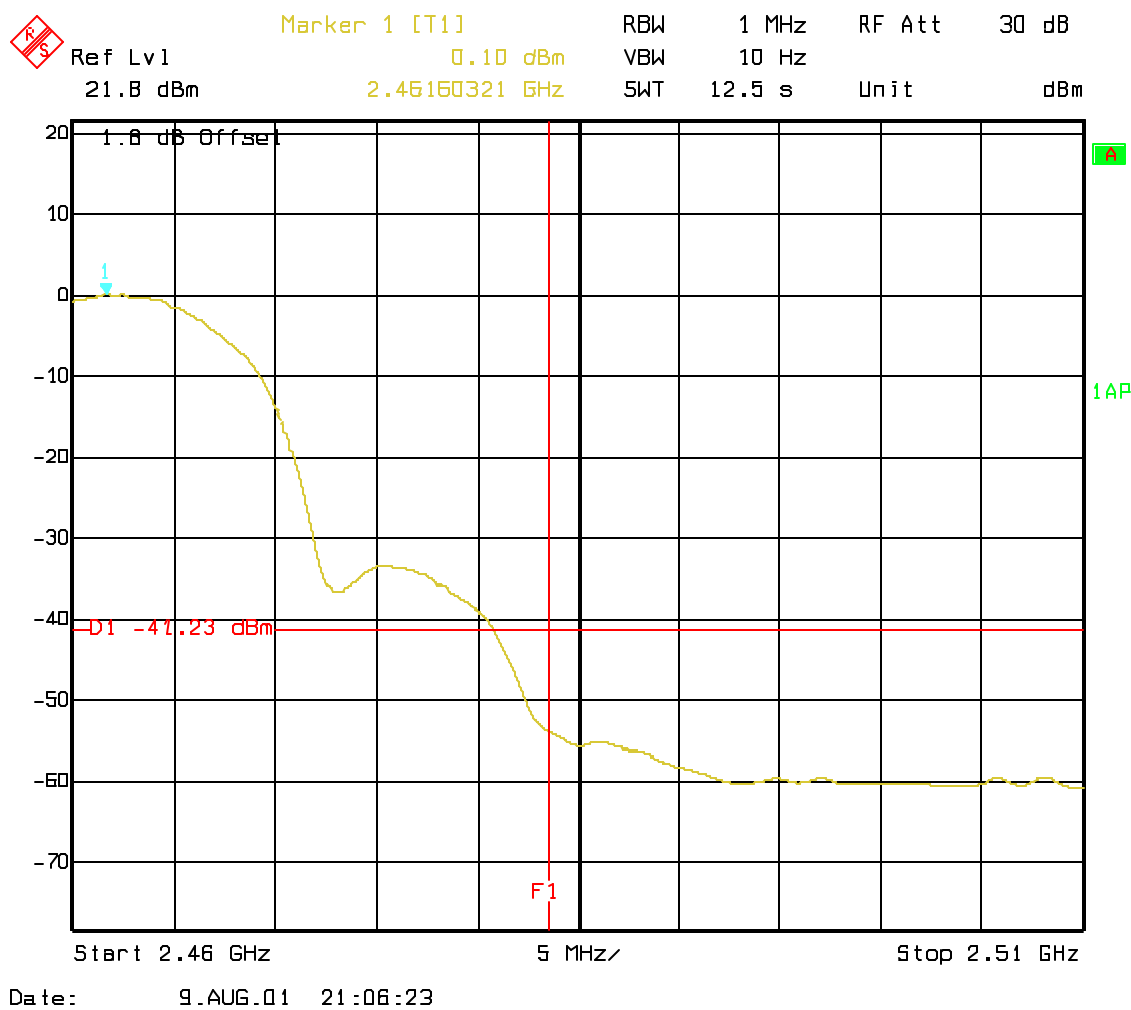
Conducted

30 MHz up to 25 GHz (This plot is valid for low, mid & high channels)



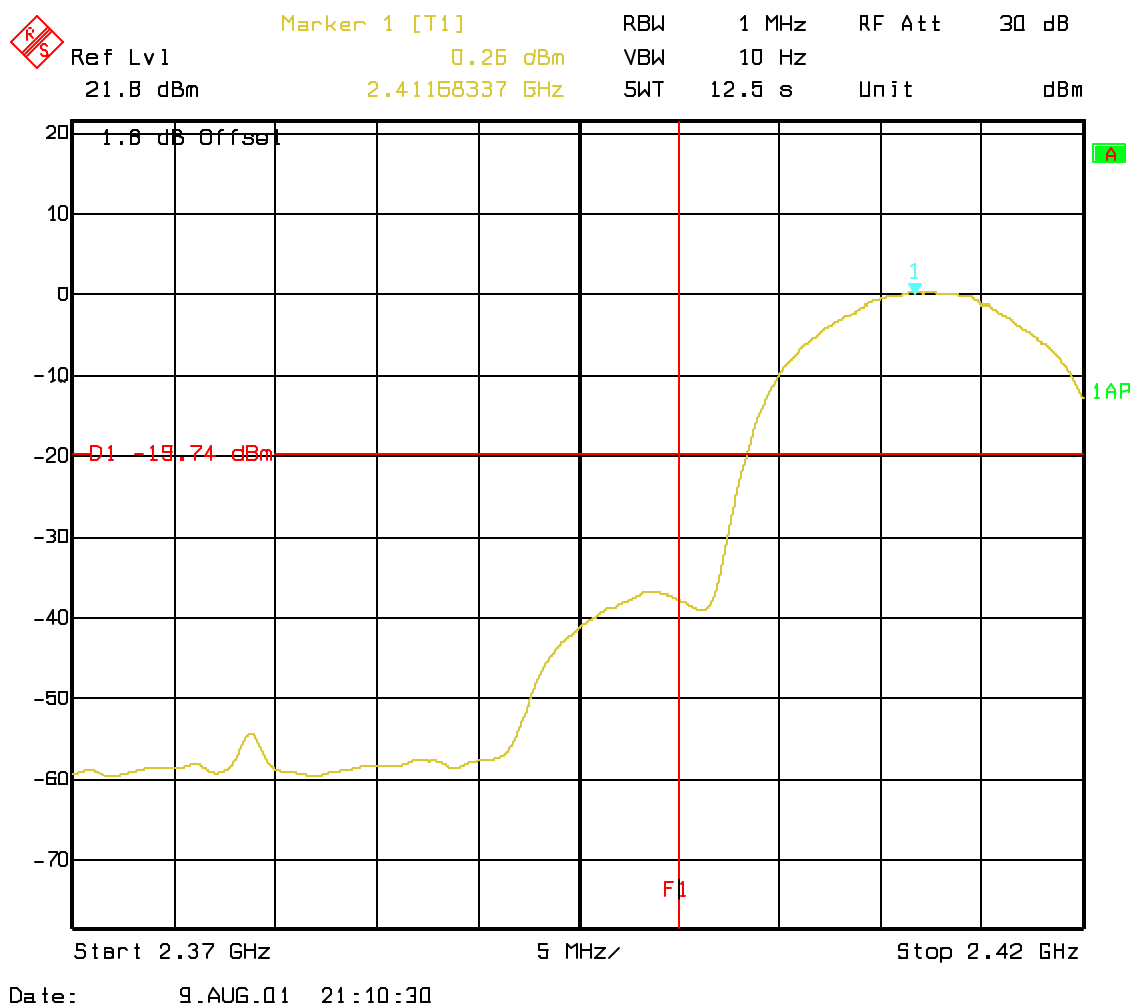
EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (2)

conducted
spurious in the restricted band 2483.5 – 2500 MHz
(Higher Band Edge)



Lower Band Edge

conducted

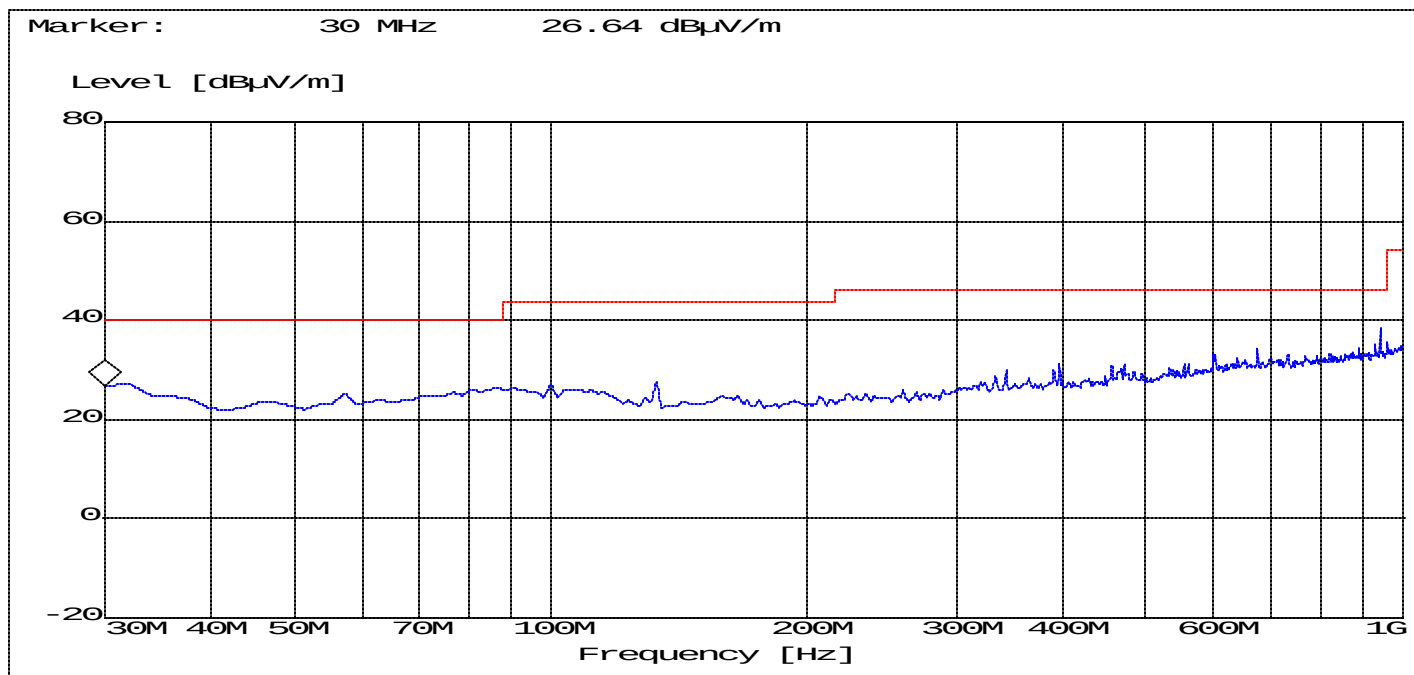


EMISSION LIMITATIONS (Transmitter)**SUBCLAUSE § 15.247 (c) (1)**

The spurious 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 18 and 26 GHz very short cable connections to the antenna was used to minimize the noise level. Channel 1: 2412 MHz; Channel 2: 2437 MHz; Channel 3: 2462 MHz.

All emission measurements were done in Peak mode to reduce measurement time. In case limits are exceeded the measurements will be repeated and documented in the test report either with Quasi Peak or average detector depending on the frequency range specified in FCC 15 and/or DA00-705. Bandwidth, sweep time etc. were set according DA00-705 and recorded

Lowest Channel(2412MHz): 30MHz-1GHz

**LIMITS****SUBCLAUSE § 15.247 (c)**

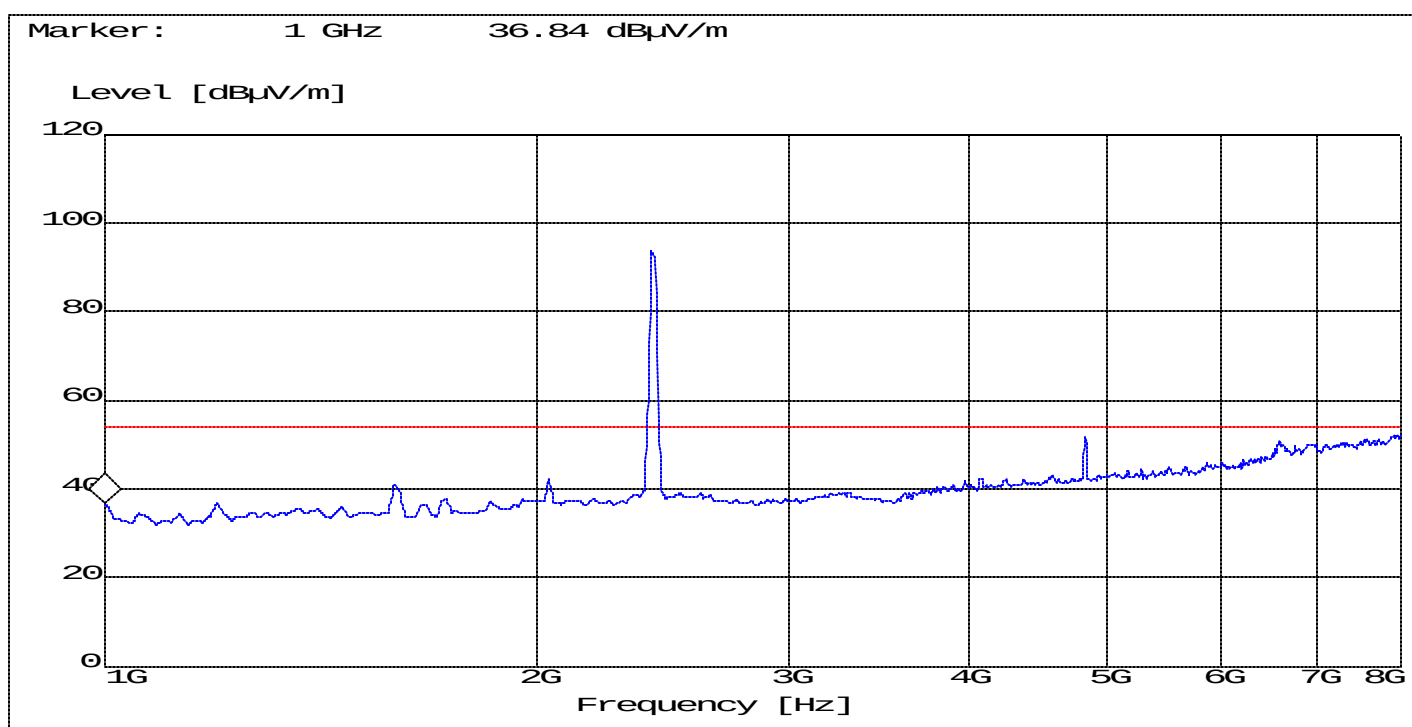
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**Lowest Channel(2412MHz): 1GHz-8GHz**

NOTE: The peak above the limit is the carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

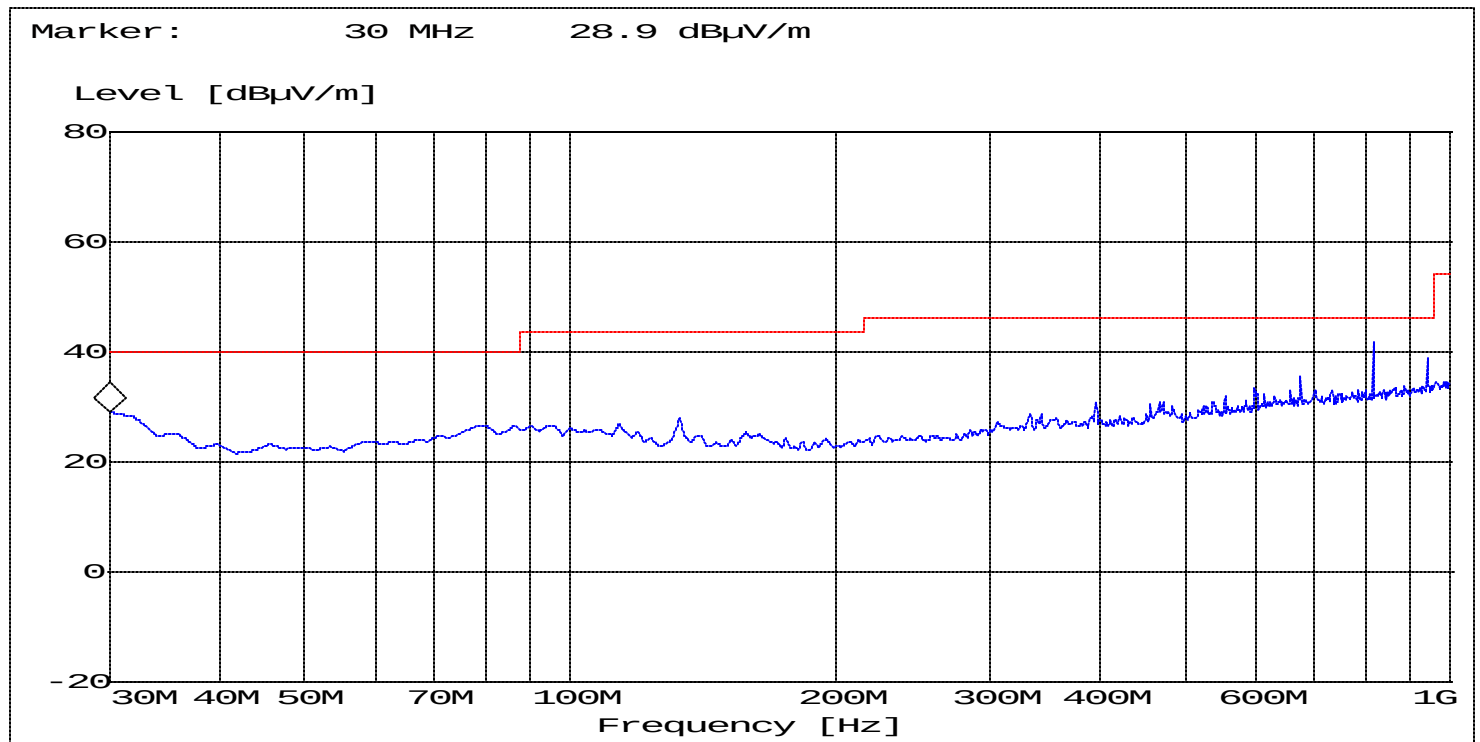
**LIMITS****SUBCLAUSE § 15.247 (c)**

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).

ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHzf ³ 1GHz : RBW/VBW: 1 MHz

EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)

Mid Channel(2437MHz): 30MHz -1GHz



LIMITS

SUBCLAUSE § 15.247 (c)

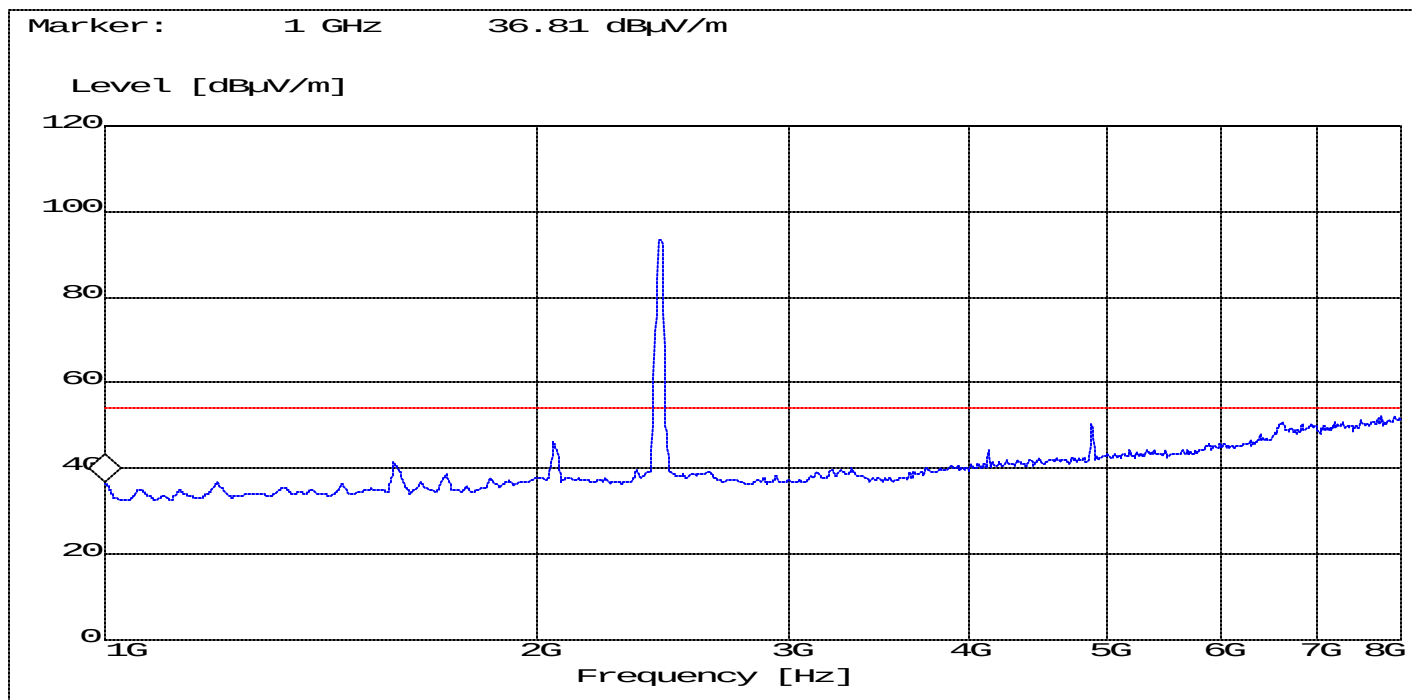
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

ANALYZER SETTINGS: $f < 1 \text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**Mid Channel(2437MHz): 1GHz -8GHz**

NOTE: The peak above the limit is the carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

**LIMITS****SUBCLAUSE § 15.247 (c)**

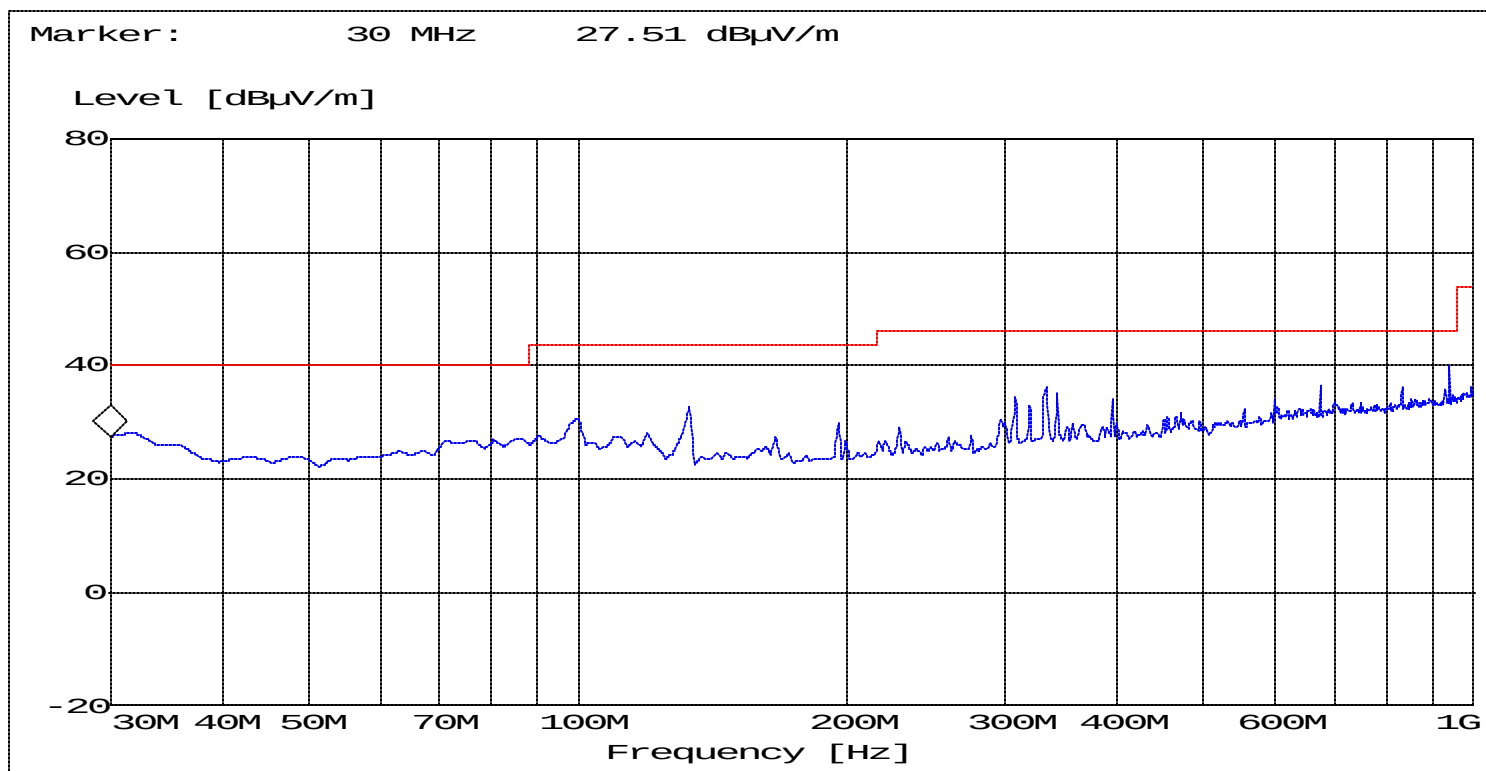
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)

Highest Channel(2462MHz): 30MHz -1GHz



LIMITS

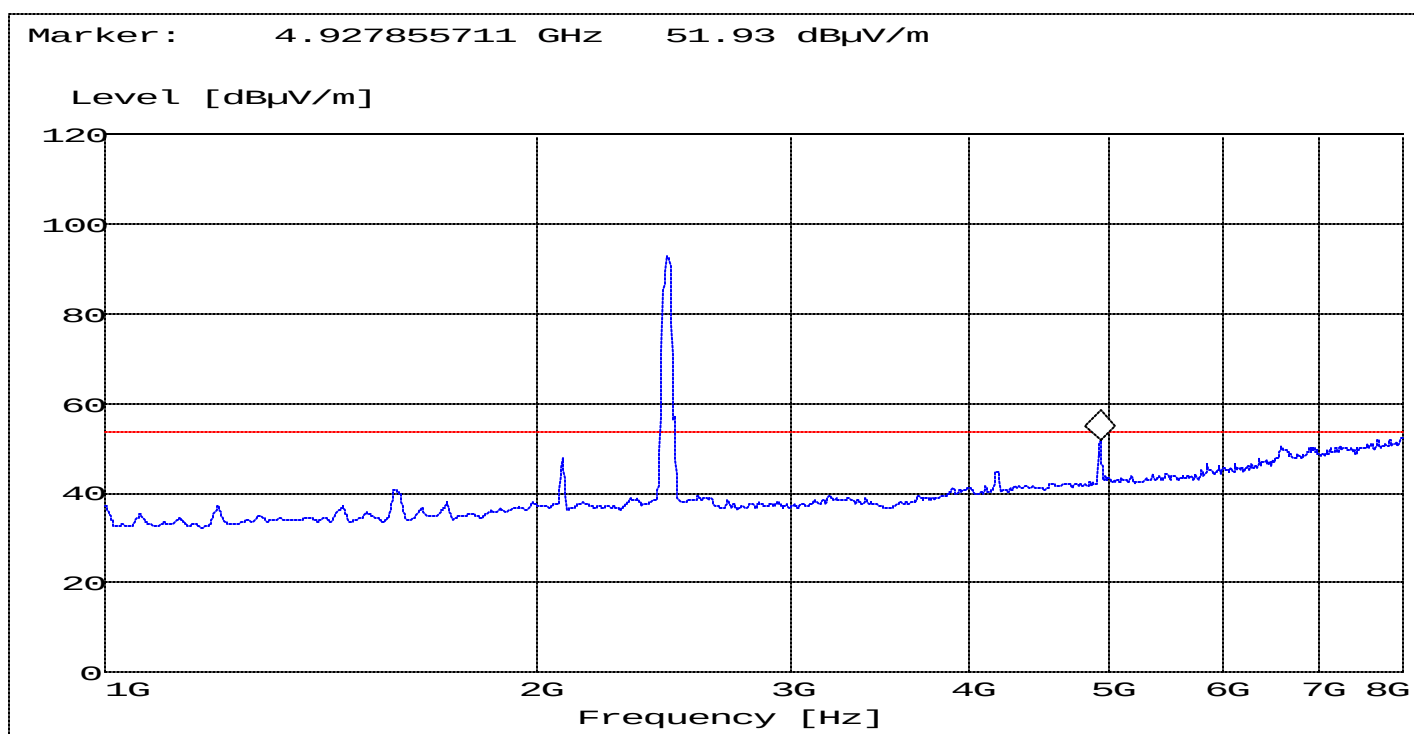
SUBCLAUSE § 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).

ANALYZER SETTINGS: $f < 1$ GHz : RBW/VBW: 100 kHz $f \geq 1$ GHz : RBW/VBW: 1 MHz

EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)**Highest Channel(2462MHz): 1GHz -8GHz**

NOTE: The peak above the limit is the carrier frequency. Frequency resolution is not fine enough to show the exact frequency of the carrier, refer to plots under EIRP.

**LIMITS****SUBCLAUSE § 15.247 (c)**

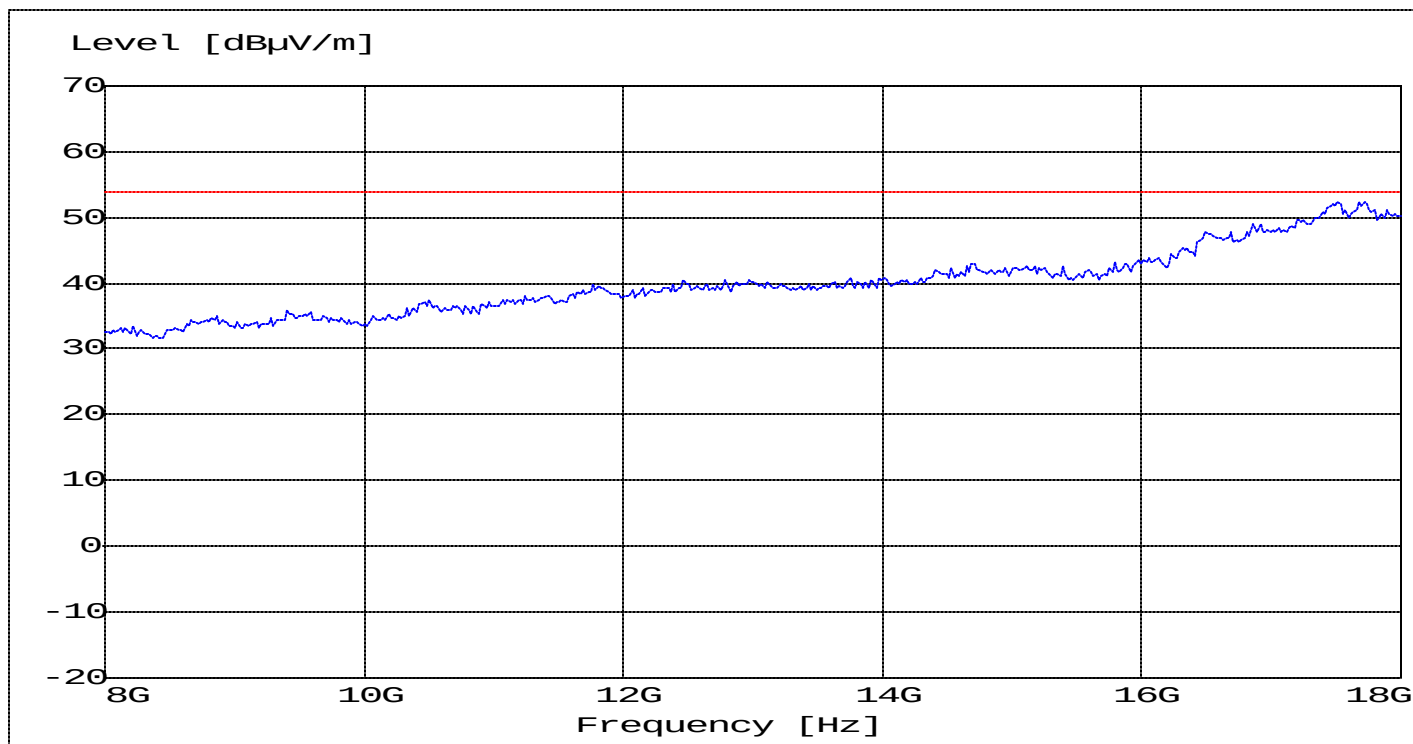
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

ANALYZER SETTINGS: $f < 1 \text{ GHz}$: RBW/VBW: 100 kHz $f \geq 1 \text{ GHz}$: RBW/VBW: 1 MHz

EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)

Highest Channel(2462MHz): 8GHz -18GHz

(This plot is valid for low, mid & high channels)



LIMITS

SUBCLAUSE § 15.247 (c)

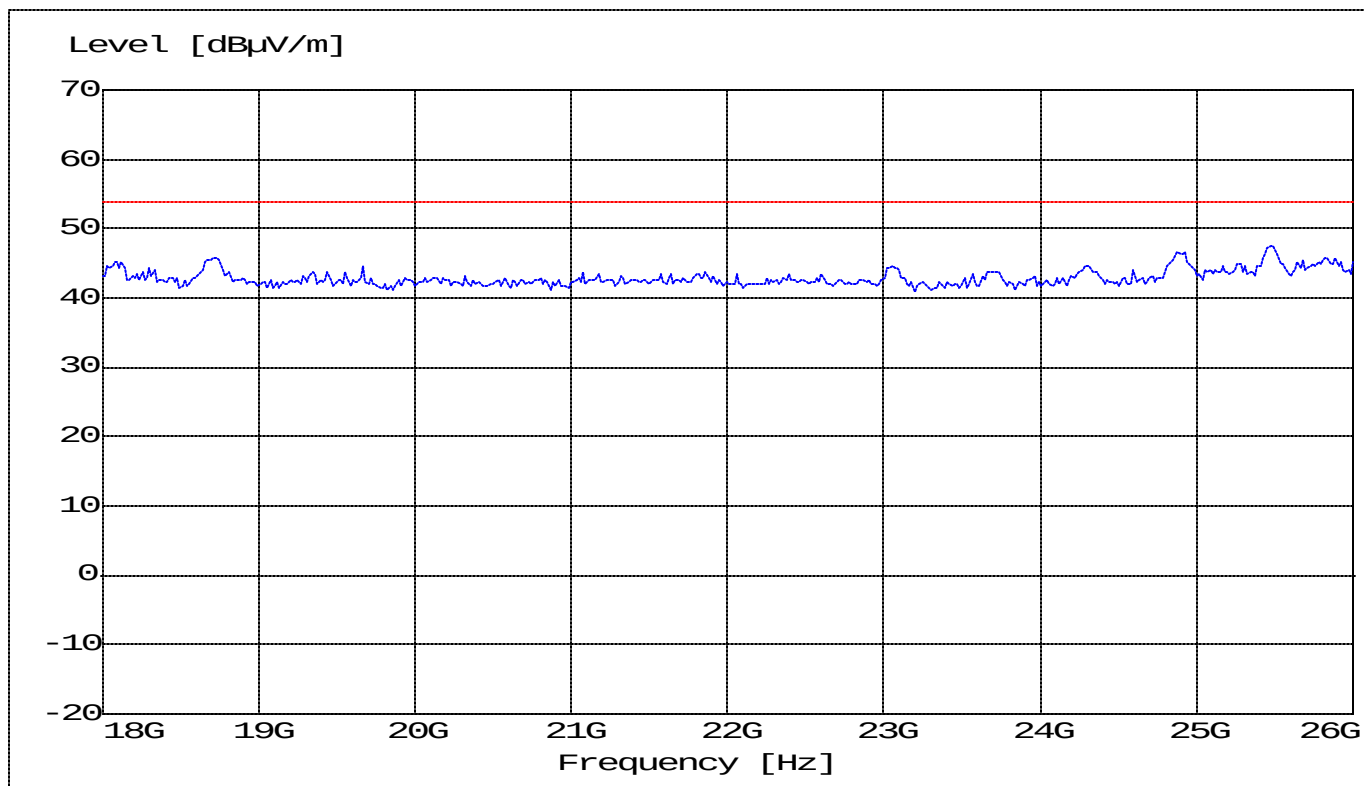
In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

EMISSION LIMITATIONS (Transmitter) SUBCLAUSE § 15.247 (c) (1)

Highest Channel(2462MHz): 18GHz -26GHz
(This plot is valid for low, mid & high channels)

**LIMITS****SUBCLAUSE § 15.247 (c)**

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. 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)).

ANALYZER SETTINGS: $f < 1\text{ GHz}$: RBW/VBW: 100 kHz

$f \geq 1\text{ GHz}$: RBW/VBW: 1 MHz

POWER SPECTRAL DENSITY**SUBCLAUSE § 15.247 (d)**

TEST CONDITIONS		RF POWER LEVEL IN 3 kHz BW		
Frequency (MHz)		2412	2437	2462
T _{nom} (23)° C	V _{nom} (5.0)V	-13.05 dBm	-13.11dBm	-13.41 dBm
Measurement uncertainty		±3dB		

LIMIT**SUBCLAUSE §15.247(d)**

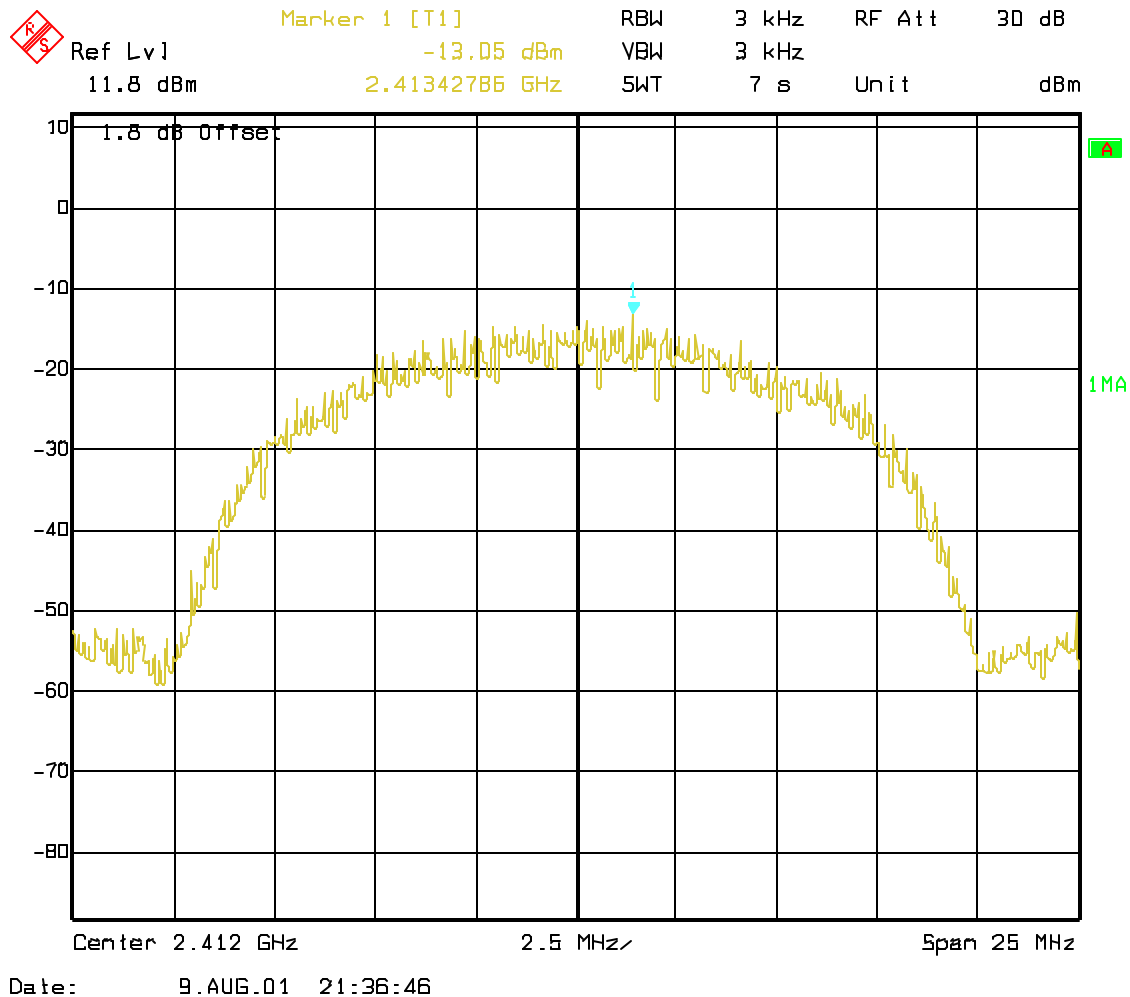
The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

ANALYZER SETTINGS: RBW=3KHz , VBW=3KHz

POWER SPECTRAL DENSITY

SUBCLAUSE § 15.247 (d)

Lowest Channel: 2412 MHz



LIMIT

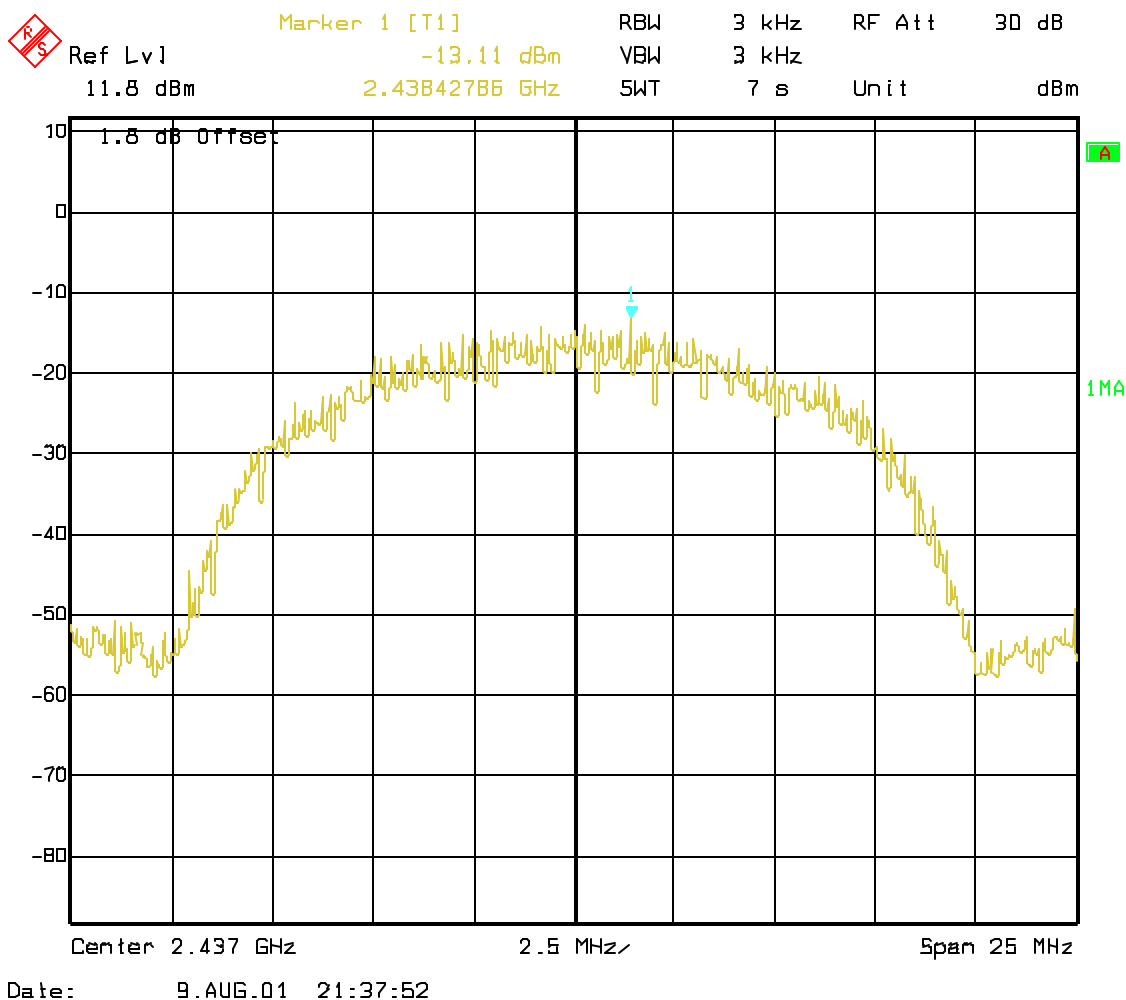
SUBCLAUSE §15.247(d)

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

POWER SPECTRAL DENSITY

SUBCLAUSE § 15.247 (d)

Mid Channel: 2437 MHz



LIMIT

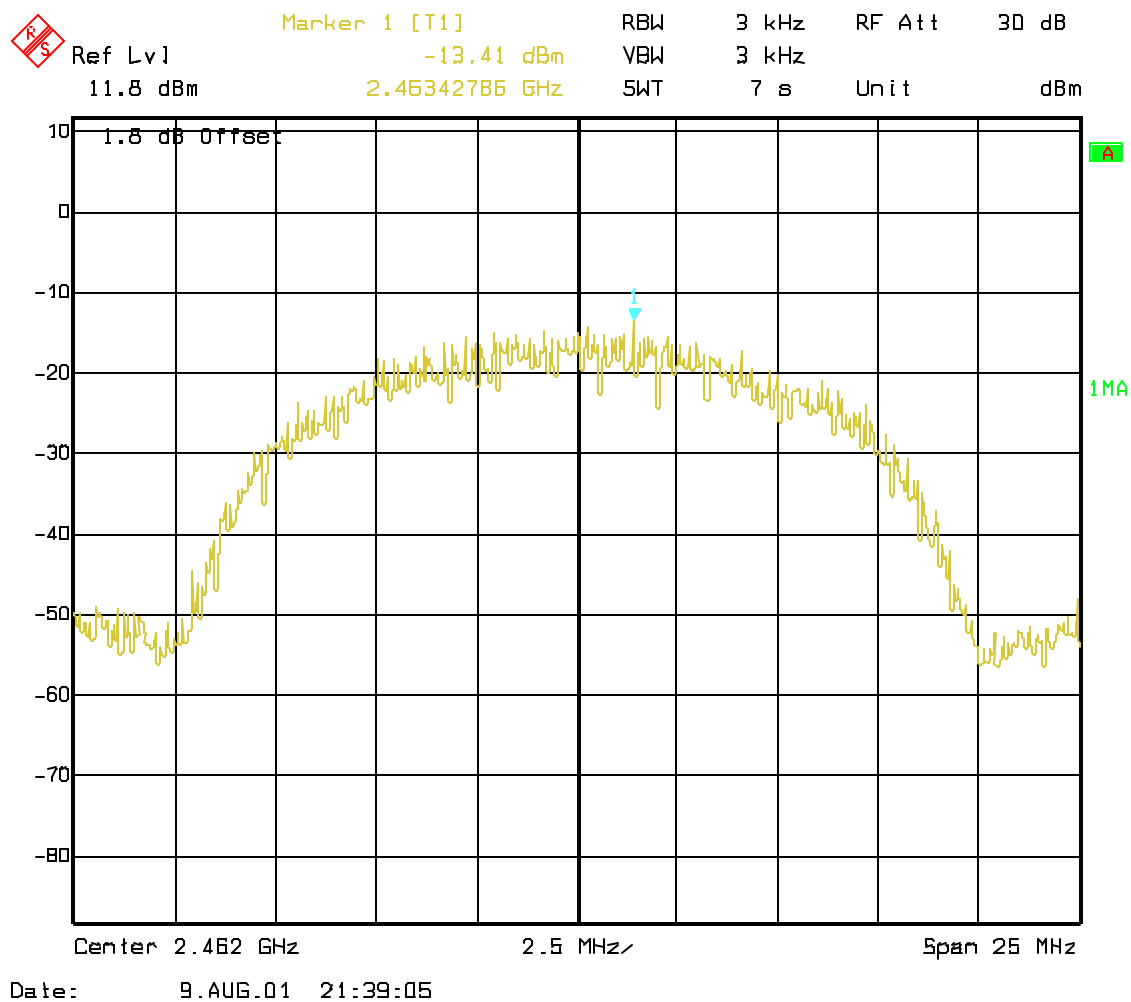
SUBCLAUSE §15.247(d)

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

POWER SPECTRAL DENSITY

SUBCLAUSE § 15.247 (d)

Highest Channel: 2462 MHz



LIMIT

SUBCLAUSE §15.247(d)

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band

(NOTE: The processing gain data is provided by Chip Set Manufacturer)

[illegible]

[illegible]

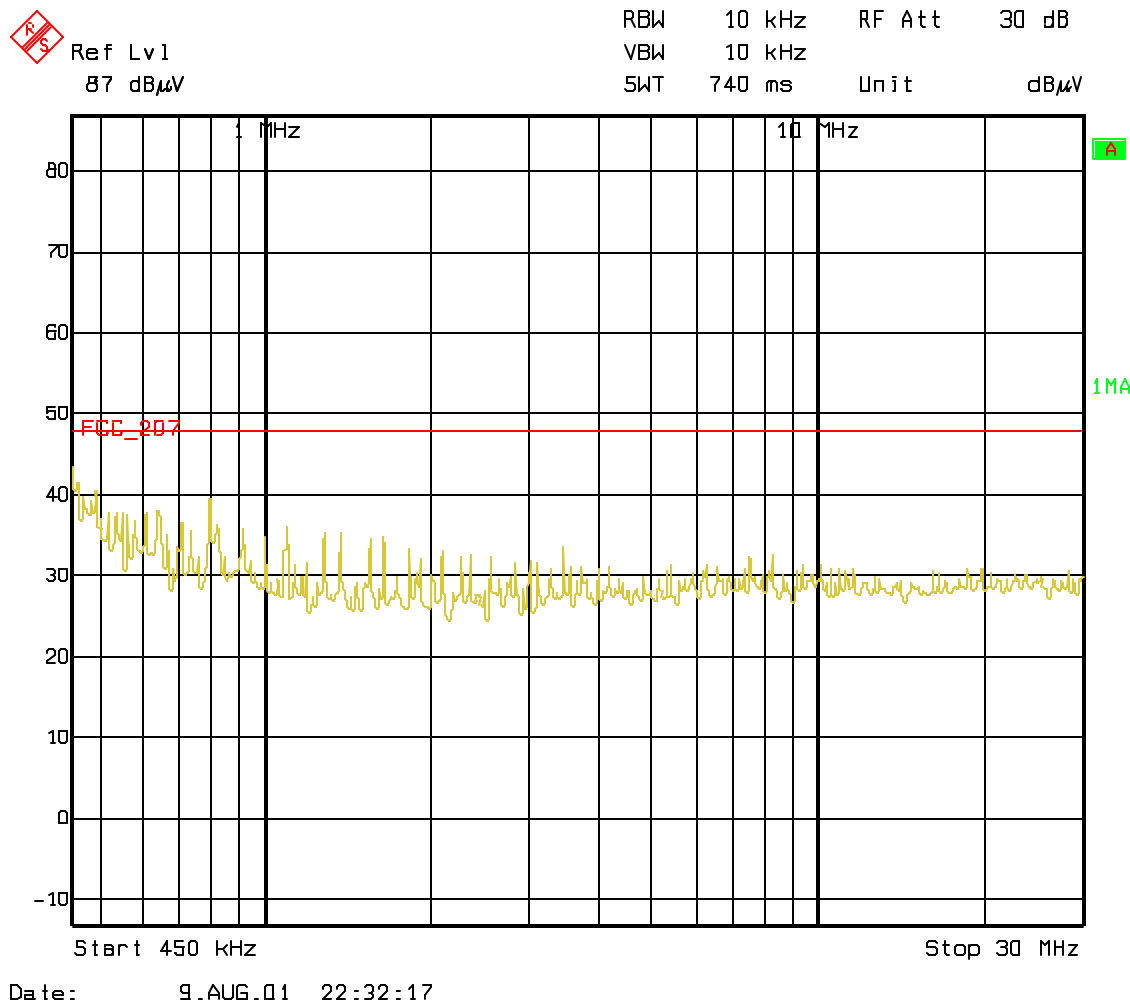
[illegible]

CONDUCTED EMISSIONS

§ 15.107/207

Measured with AC/DC power adapter plugged in LISN

Phase: Line

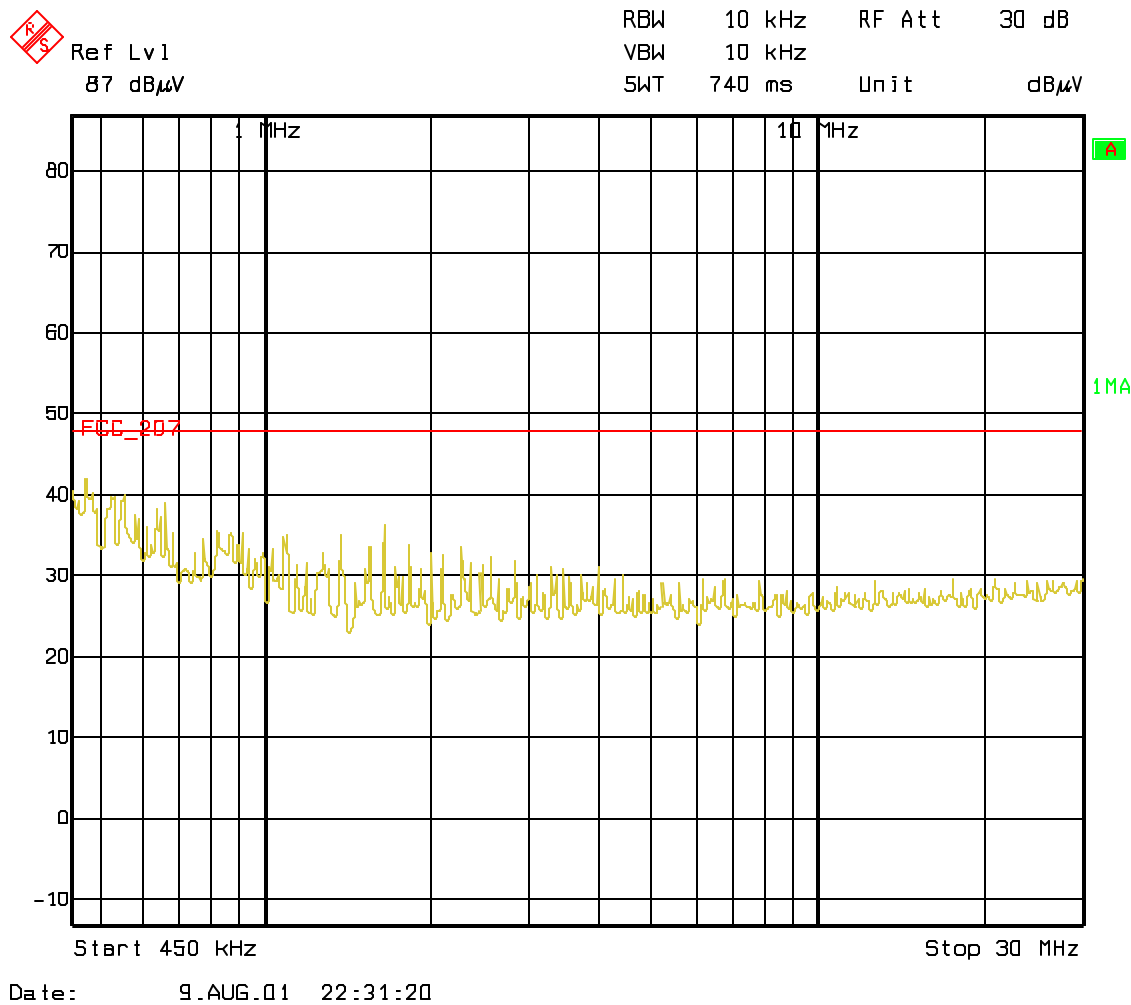


Technical specification : 15.107 / 15.207 (Revised as of October 1, 1991)
Limit



0.45 to 30 MHz	250 μ V / 47.96 dB μ V
----------------	--------------------------------

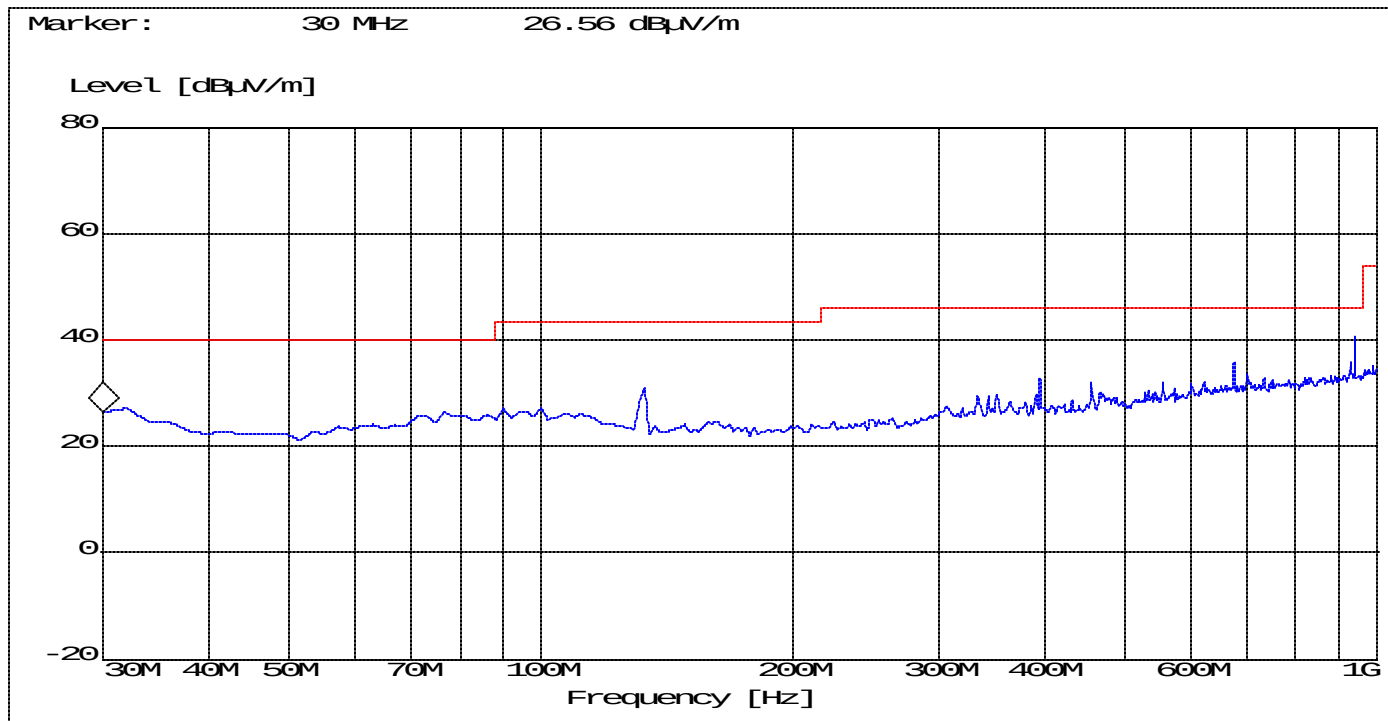
Phase: Neutral



RECEIVER SPURIOUS RADIATION

§ 15.209

Lowest Channel(2412MHz): 30MHz – 1GHz



Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μ 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: All measurements were done in peak mode)

ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

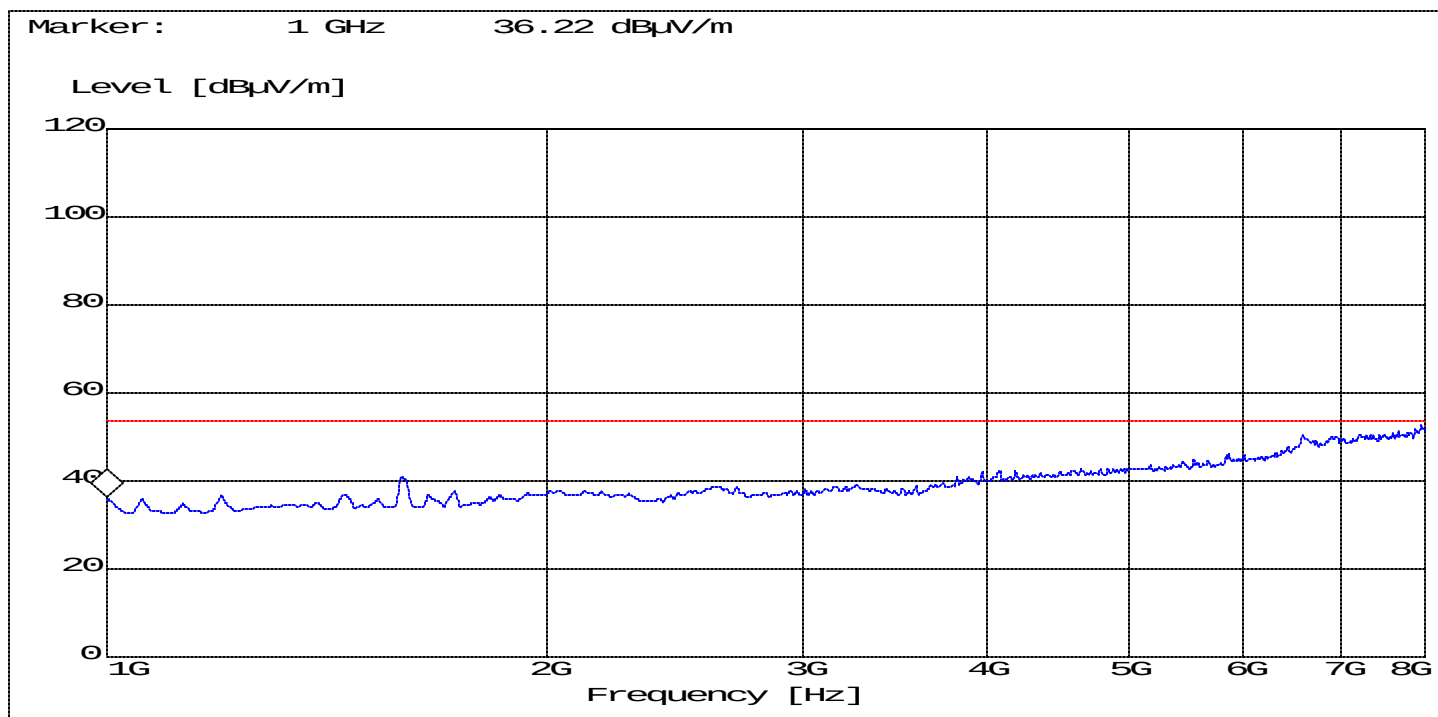
f $\geq$ 1GHz : RBW/VBW: 1 MHz

RECEIVER SPURIOUS RADIATION

§ 15.209

Lowest Channel(2412MHz): 1GHz – 8GHz

NOTE: The peak above the limit is the carrier frequency.



Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μ 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: All measurements were done in peak mode)

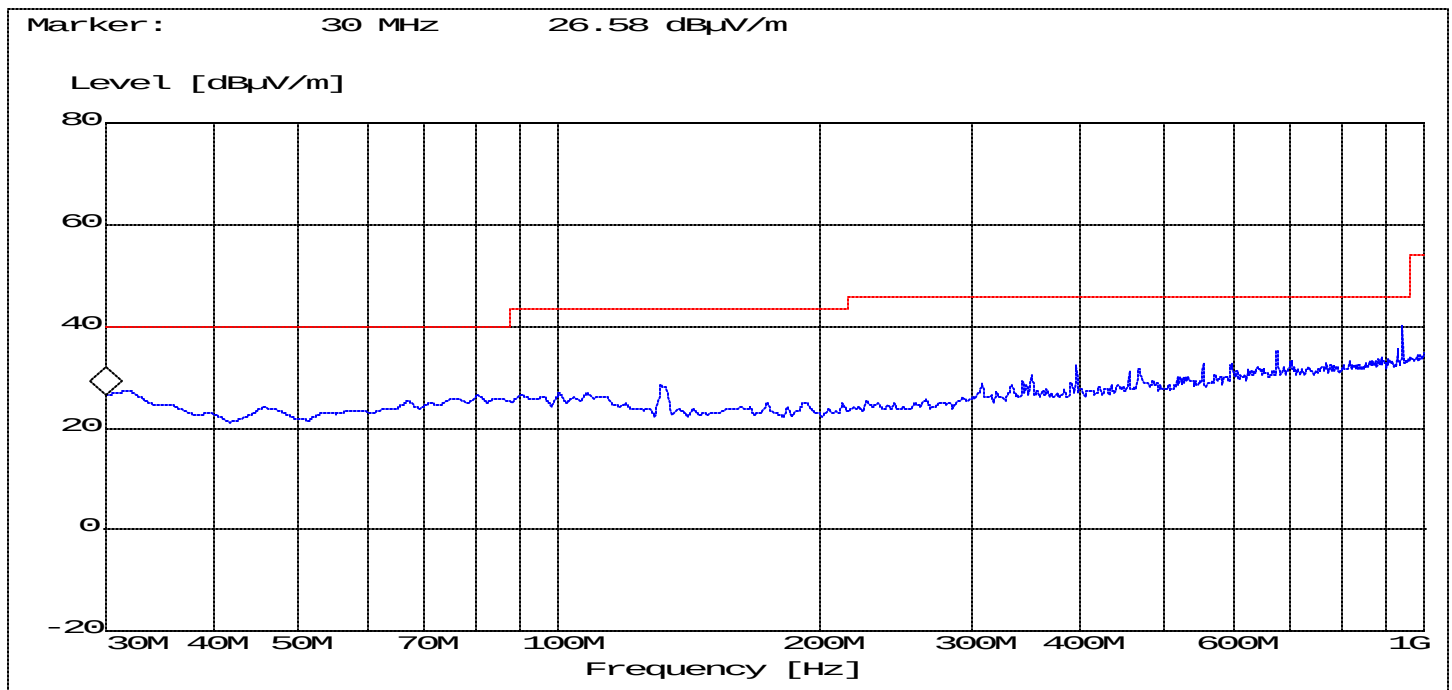
ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

f $\geq$ 1GHz : RBW/VBW: 1 MHz

RECEIVER SPURIOUS RADIATION

§ 15.209

Mid Channel(2437MHz): 30MHz – 1GHz



Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μ 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: All measurements were done in peak mode)

ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

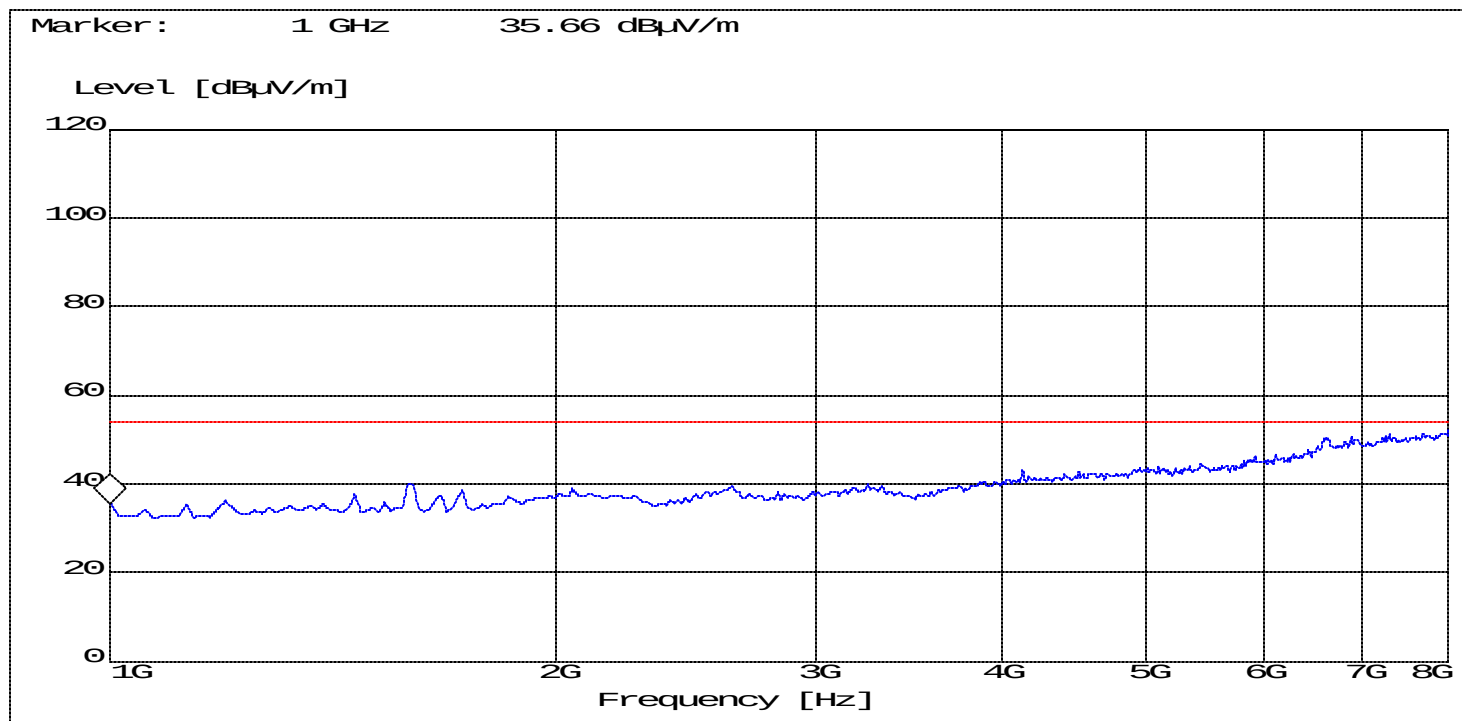
f $\geq$ 1GHz : RBW/VBW: 1 MHz

RECEIVER SPURIOUS RADIATION

§ 15.209

Mid Channel(2437MHz): 1GHz – 8GHz

NOTE: The peak above the limit is the carrier frequency.



Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μ 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: All measurements were done in peak mode)

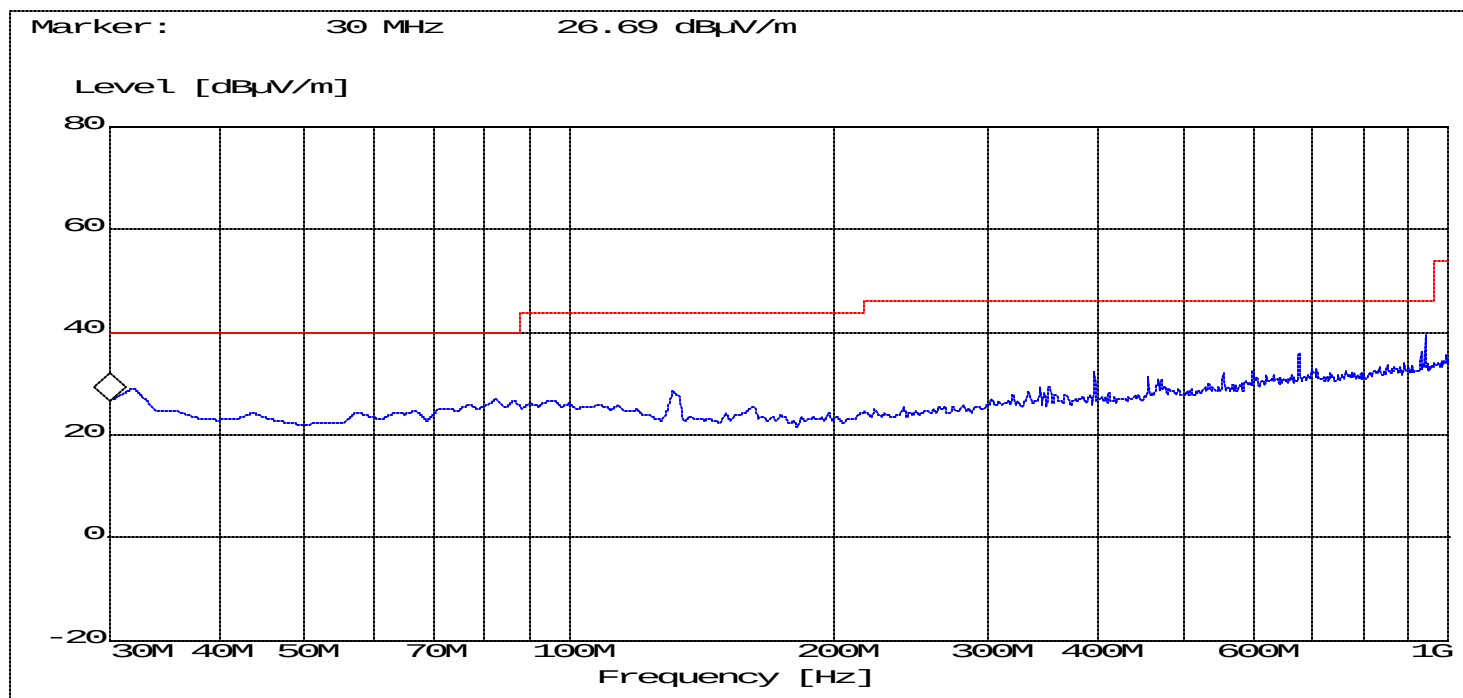
ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

f $\geq$ 1GHz : RBW/VBW: 1 MHz

RECEIVER SPURIOUS RADIATION

§ 15.209

Highest Channel(2462MHz): 30MHz – 1GHz



Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μ 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: All measurements were done in peak mode)

ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

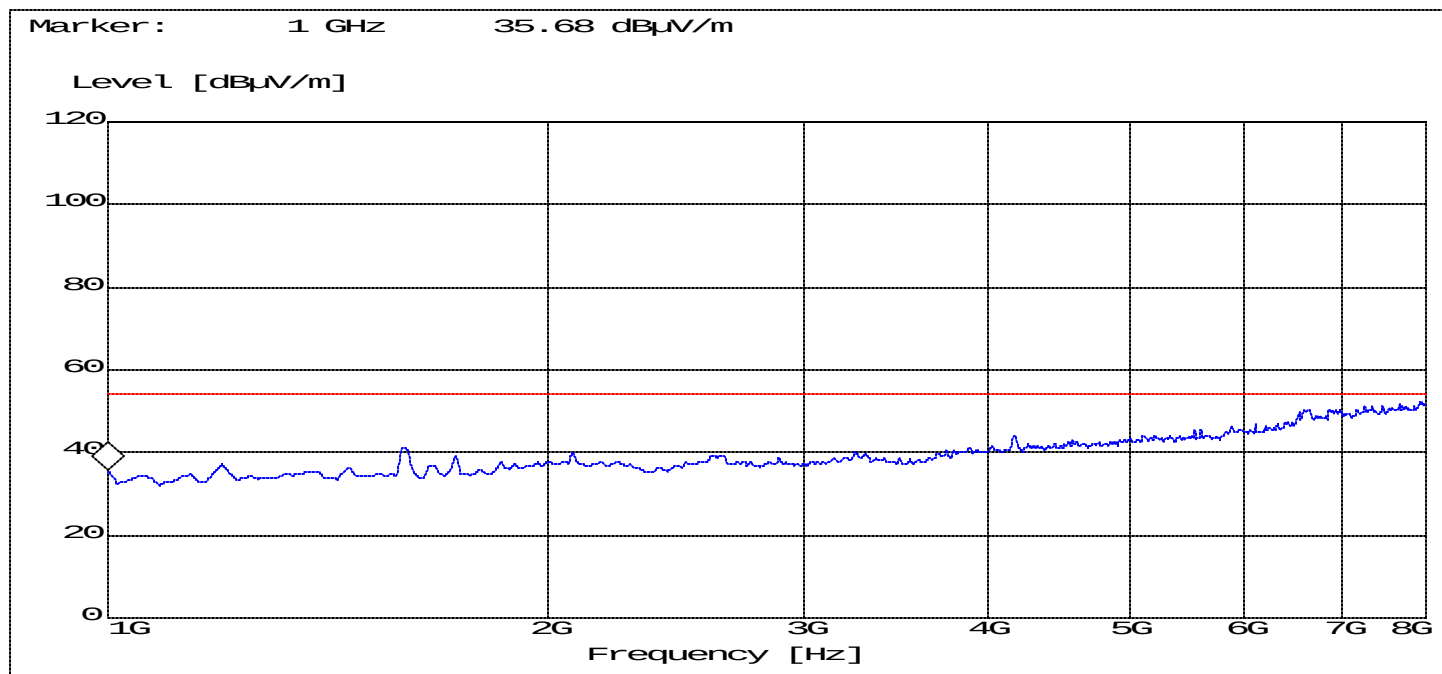
f $\geq$ 1GHz : RBW/VBW: 1 MHz

RECEIVER SPURIOUS RADIATION

§ 15.209

Highest Channel(2462MHz): 1GHz – 8GHz

NOTE: The peak above the limit is the carrier frequency.



Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μ 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: All measurements were done in peak mode)

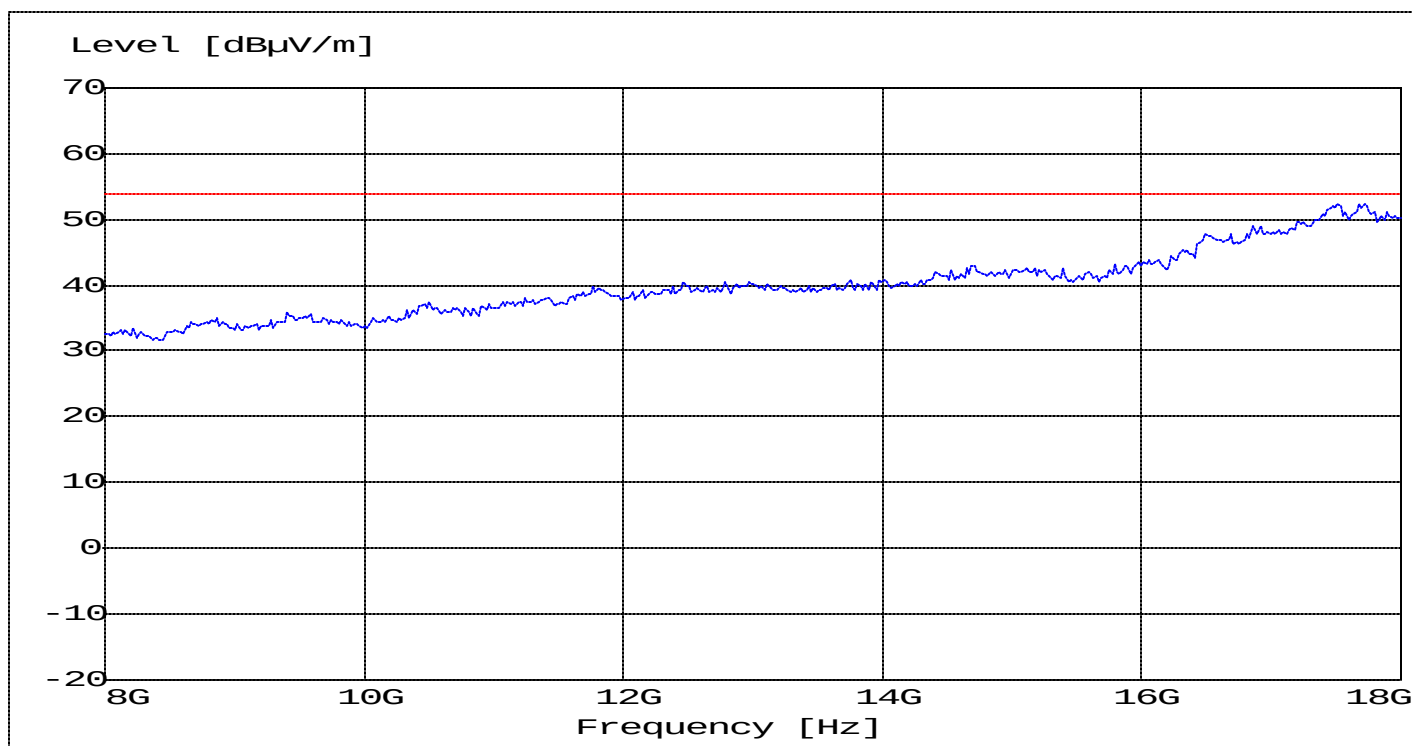
ANALYZER SETTINGS: $f < 1$ GHz : RBW/VBW: 100 kHz $f \geq 1$ GHz : RBW/VBW: 1 MHz

RECEIVER SPURIOUS RADIATION

§ 15.209

8GHz – 18GHz

(NOTE: This plot is applicable for all three channels)



Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μV/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: All measurements were done in peak mode)

ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

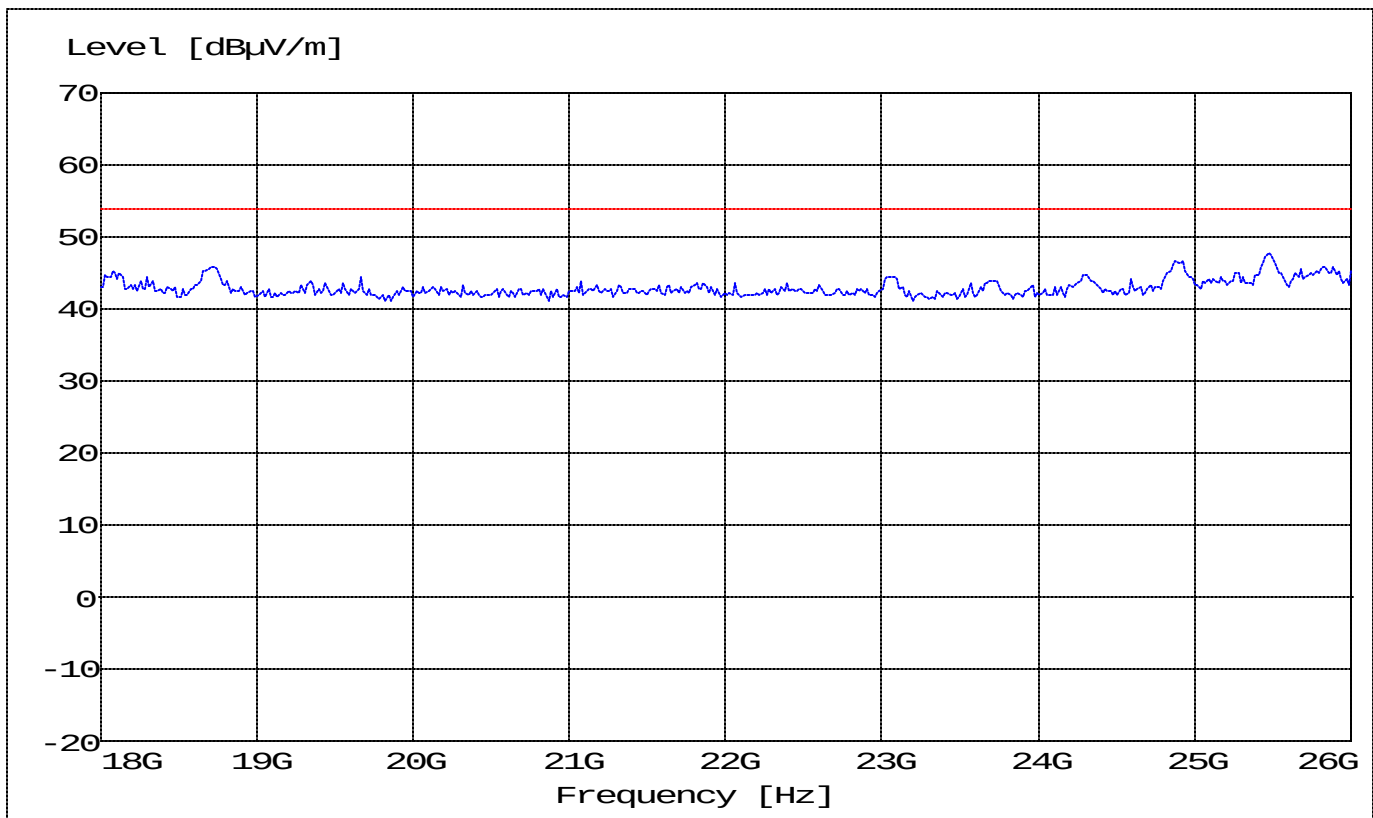
f ≥ 1GHz : RBW/VBW: 1 MHz

RECEIVER SPURIOUS RADIATION

§ 15.209

18GHz – 26GHz

(NOTE: This plot is applicable for all three channels)



Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μV/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

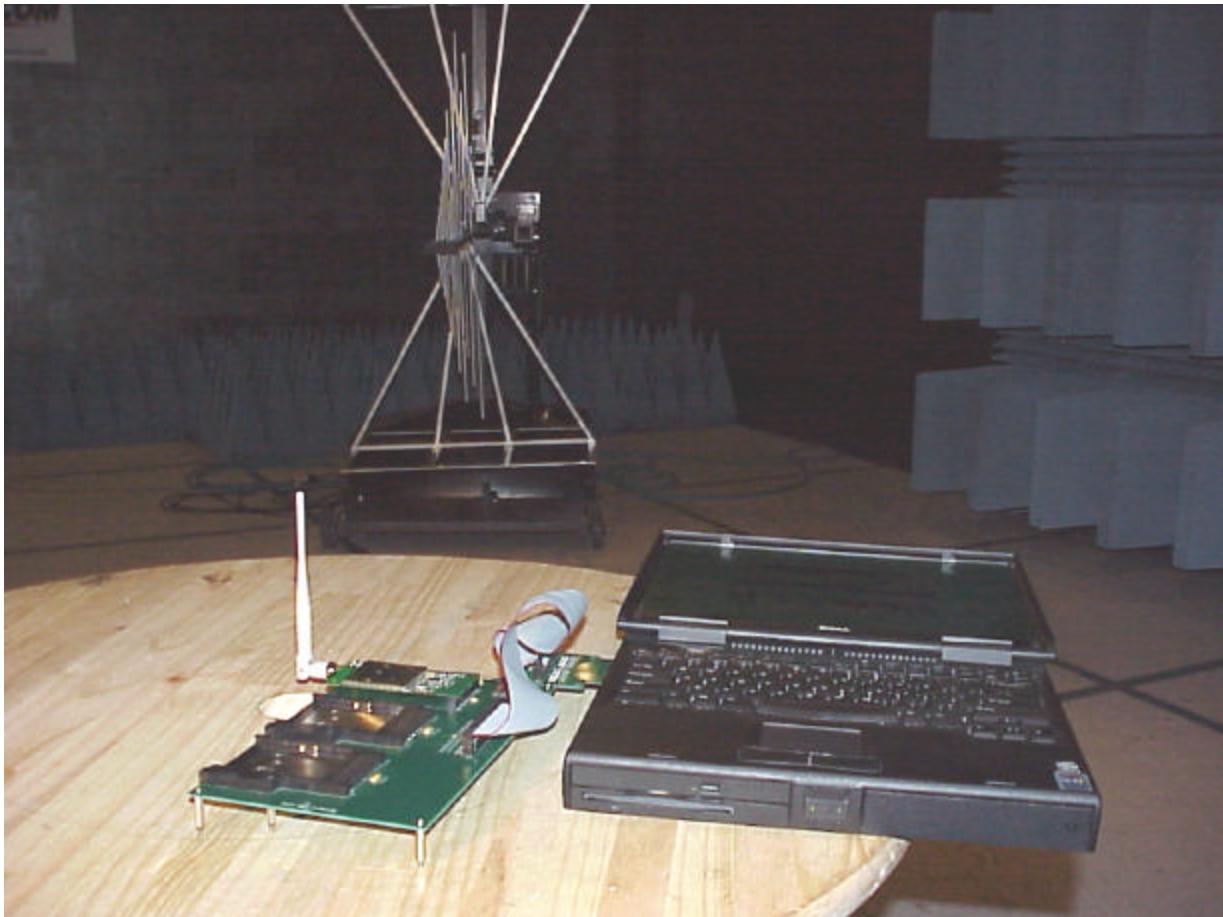
(NOTE: All measurements were done in peak mode)

ANALYZER SETTINGS: f < 1 GHz : RBW/VBW: 100 kHz

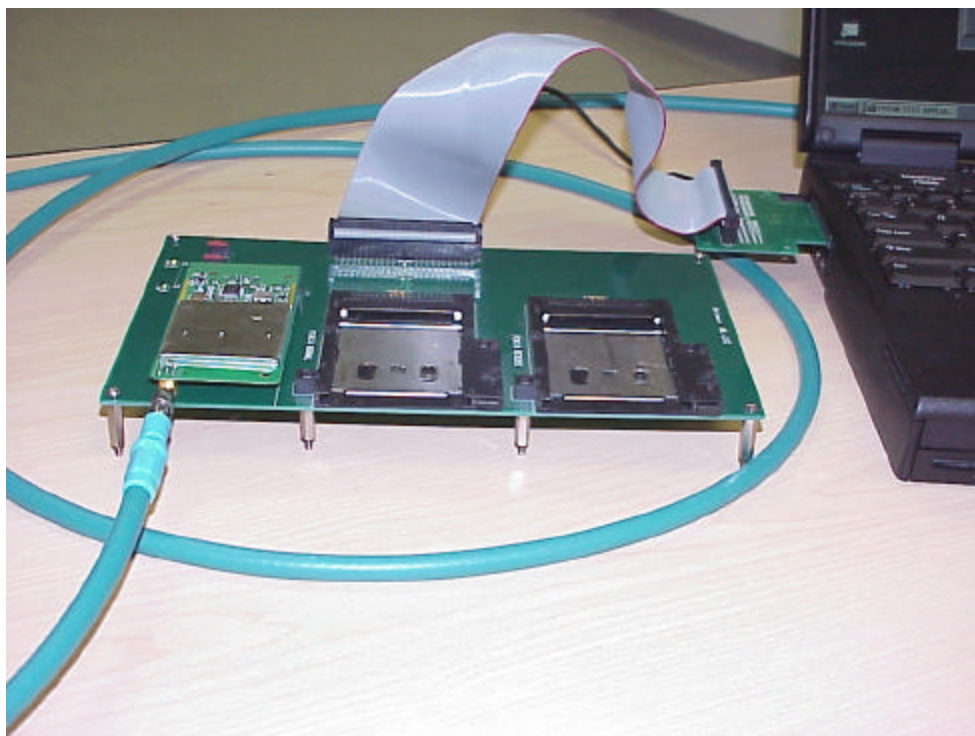
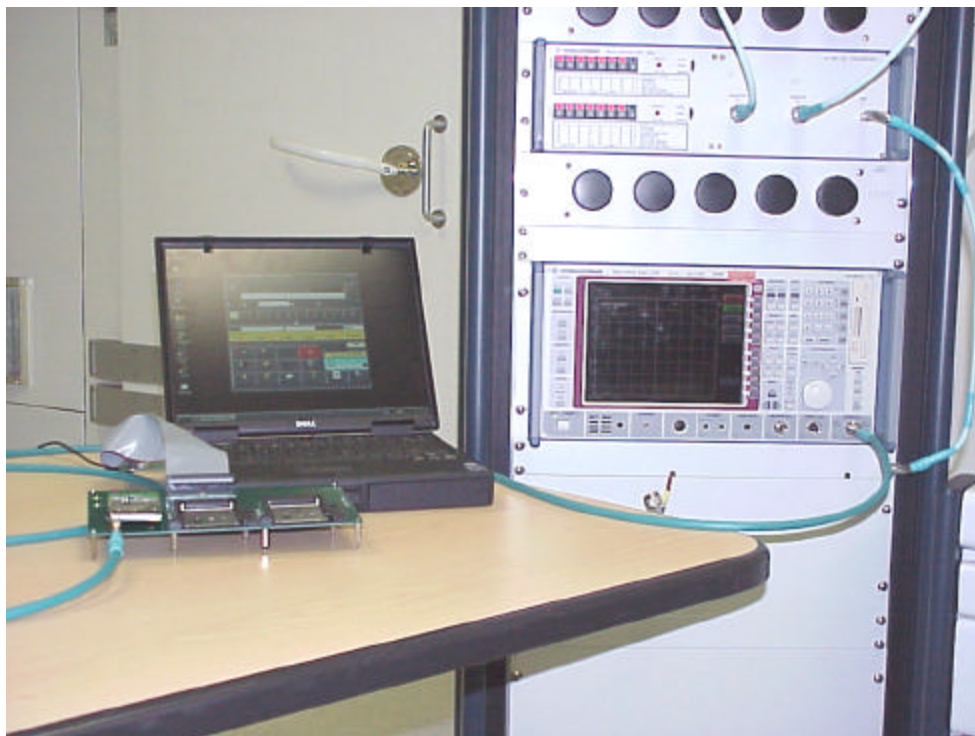
f ≥ 1GHz : RBW/VBW: 1 MHz

[illegible]

TEST SITE
Radiated Emissions



Conducted Emissions

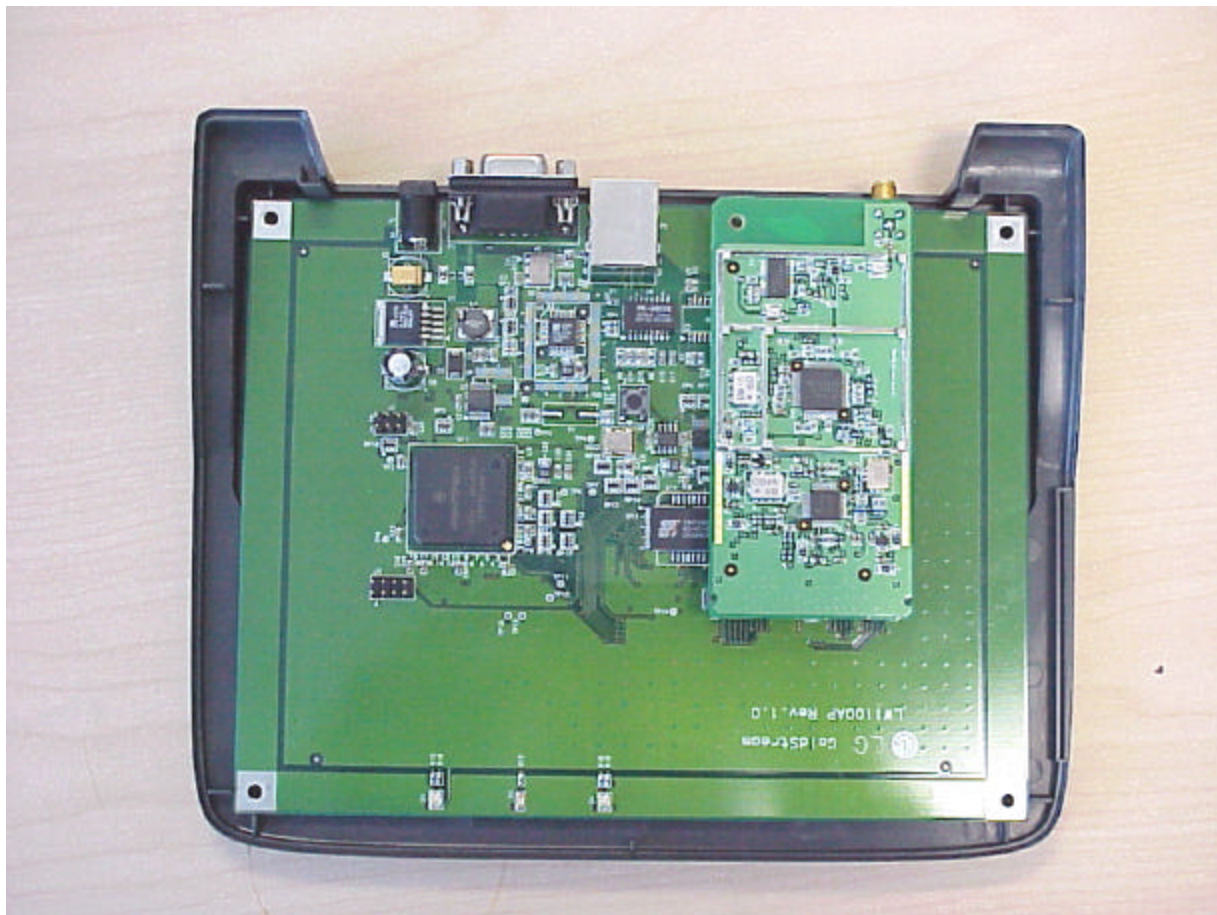


PHOTOGRAPHS OF THE EQUIPMENT

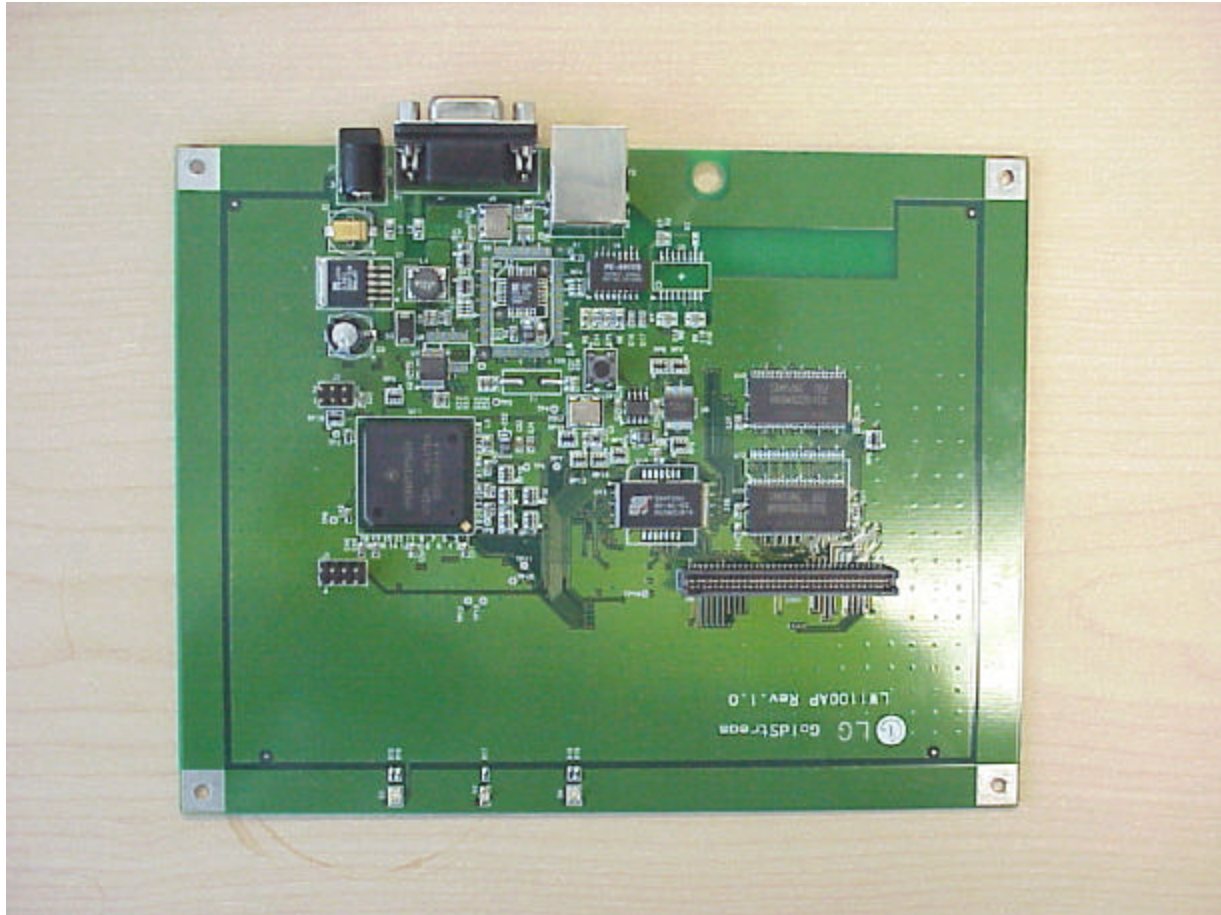
Photograph No.1: (Top View)



Photograph No.2: Top(substance with AP-RF)



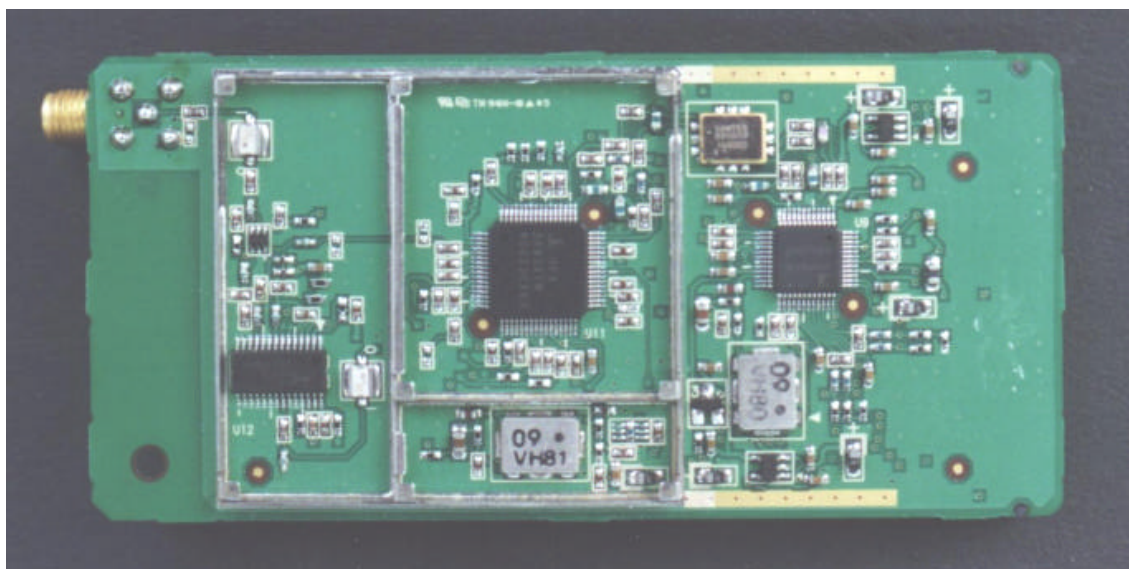
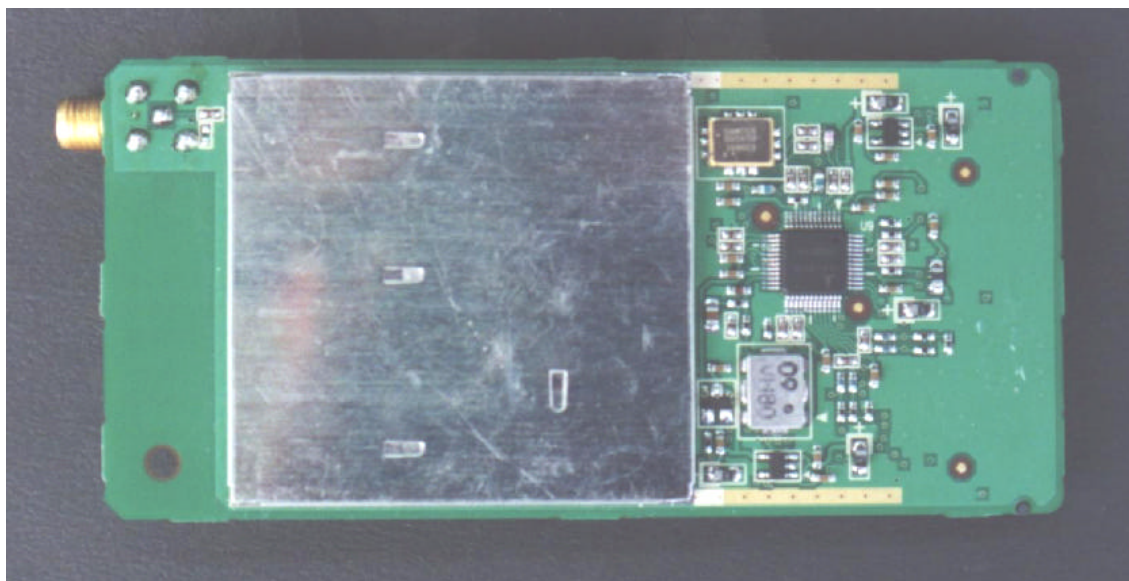
Photograph No.3: Top(substance without AP-RF)



Photograph No.4: (Rear View)



Photograph No.5: RF Board Top Side



Photograph No.6: RF Board Bottom Side

