



# FCC Test Report

Test report no.: EMC\_678FCC15.247\_2004\_WLAN

FCC Part 15.247 for DSSS systems / CANADA RSS-210

EUT Tablet PC      Model: iX104-2200  
With WLAN          Model: 2200BG  
FCC ID: Q2GIX104-121  
IC: 4596A-iX104WBG



**TTI-P-G 081/94-A0**

Accredited according to **ISO/IEC 17025**



**Bluetooth Qualification  
Test Facility  
(BQTF)**

**CTIA Authorized Test Lab**

FCC listed # 101450

IC recognized # 3925

## **CETECOM Inc.**

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### TEST REPORT PREPARED BY:

EMC Engineer: Harpreet Sidhu

1.2 Testing laboratory  
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### 1.3 Details of applicant

Name : Xplore Technologies  
Street : 14000 Summit Road, Suite 900  
City / Zip Code : Austin, TX 78728  
Country : USA  
Contact : Douglas L. Fowler  
Telephone : +1 512 336 7797  
Tele-fax : +1 512 336 7791  
e-mail : [dfowler@xploretech.com](mailto:dfowler@xploretech.com)

### 1.4 Application details

Date of receipt test item : 2004-06-21  
Date of test : 2004-06-21/22/23

### 1.5 Test item

Manufacturer : Applicant  
Marketing Name : iX104-2200  
Model No. : iX104-2200  
Description : [Tablet PC with 56g mini PCI WLAN card](#)  
FCC-ID : Q2GIX104-121  
IC ID : 4596A-iX104WBG

### Additional information

Test Sample ID : TROY  
Frequency : 2412MHz – 2462MHz  
Type of modulation : DSSS / OFDM (orthogonal frequency division multiplexing)  
Number of channels : 11  
Power supply : via host Tablet PC  
Output power : 0.056W conducted peak power  
Extreme temp. Tolerance : 0°C to +70°C

### 1.6 Test standards: FCC Part 15 §15.247 / CANADA RSS-210

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

[The Tablet PC \(model# iX104-2200\) carries pre-certified WLAN mini PCI card with FCC ID: PD9WM3B2200BG](#)

[This test report covers full radiated testing as per FCC 15.247 on Tablet PC with WLAN. All conducted measurements are covered under test report# INTEL-031111F](#)

**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	
Final Verdict: (Only "passed" if all single measurements are "passed")	<b>Passed</b>

**Technical responsibility for area of testing:**

2004-07-06    EMC & Radio    Lothar Schmidt (Manager)



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Date	Section	Name	Signature
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**Responsible for test report and project leader:**

2004-07-06    EMC & Radio    Harpreet Sidhu (EMC Engineer)



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Date	Section	Name	Signature
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**2.2 Test report**

**TEST REPORT**

**Test report no.: EMC\_678FCC15.247\_2004\_WLAN**

**FCC Part 15.247 for DSSS systems / CANADA RSS-210**

**TEST REPORT REFERENCE**

<b>LIST OF MEASUREMENTS</b>		<b>PAGE</b>
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**MAXIMUM PEAK OUTPUT POWER  
(RADIATED)**

§ 15.247 (b) (1)

**EIRP:**

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
		2412	2437	2462
Frequency (MHz)				
T <sub>nom</sub> (23)°C	V <sub>nom</sub> (3.3) VDC	16.85	16.06	17.0
Measurement uncertainty		±0.5dBm		

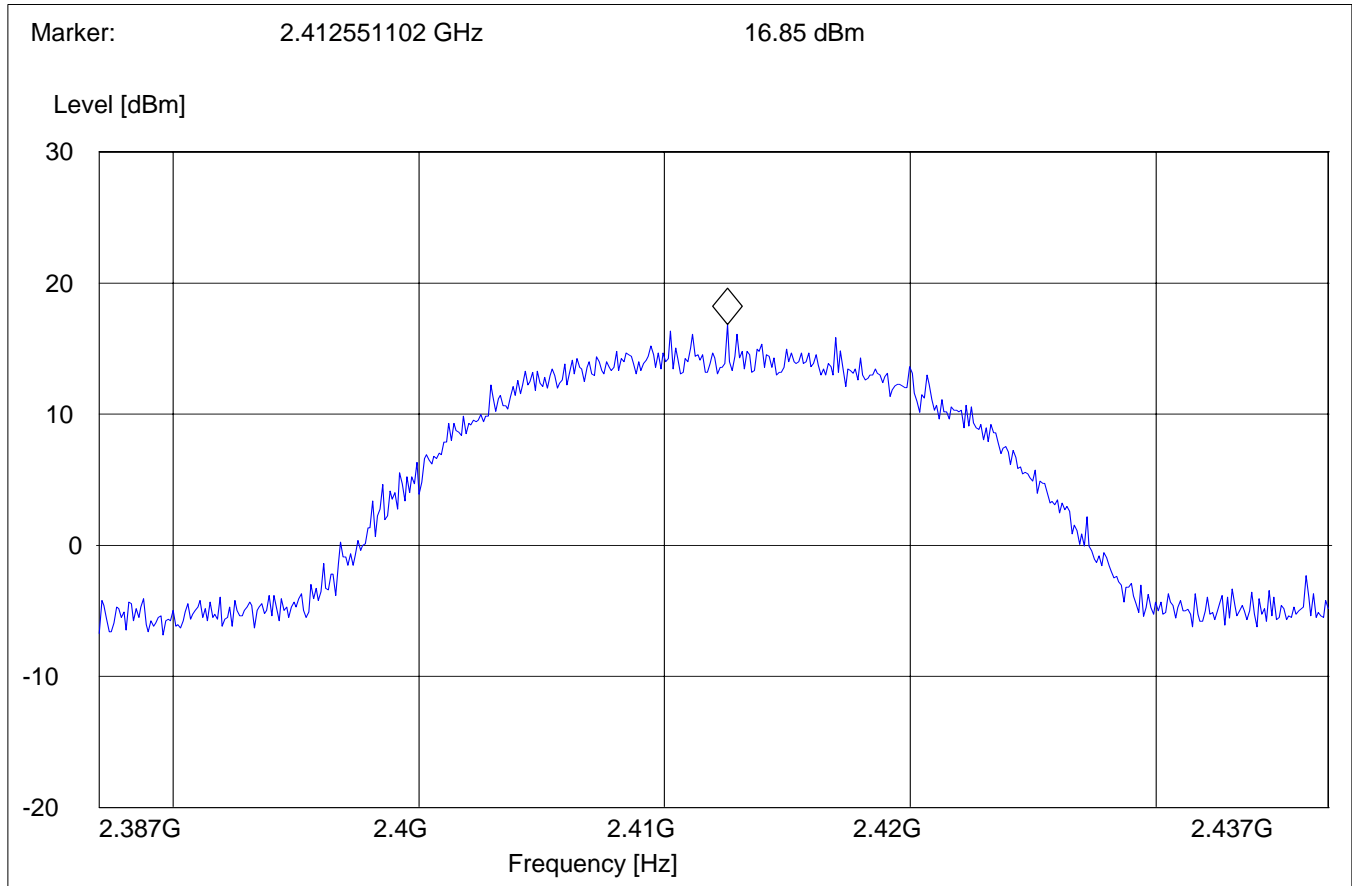
ANALYZER SETTINGS: RBW=VBW=10MHz

**LIMIT**

SUBCLAUSE § 15.247 (b) (1)

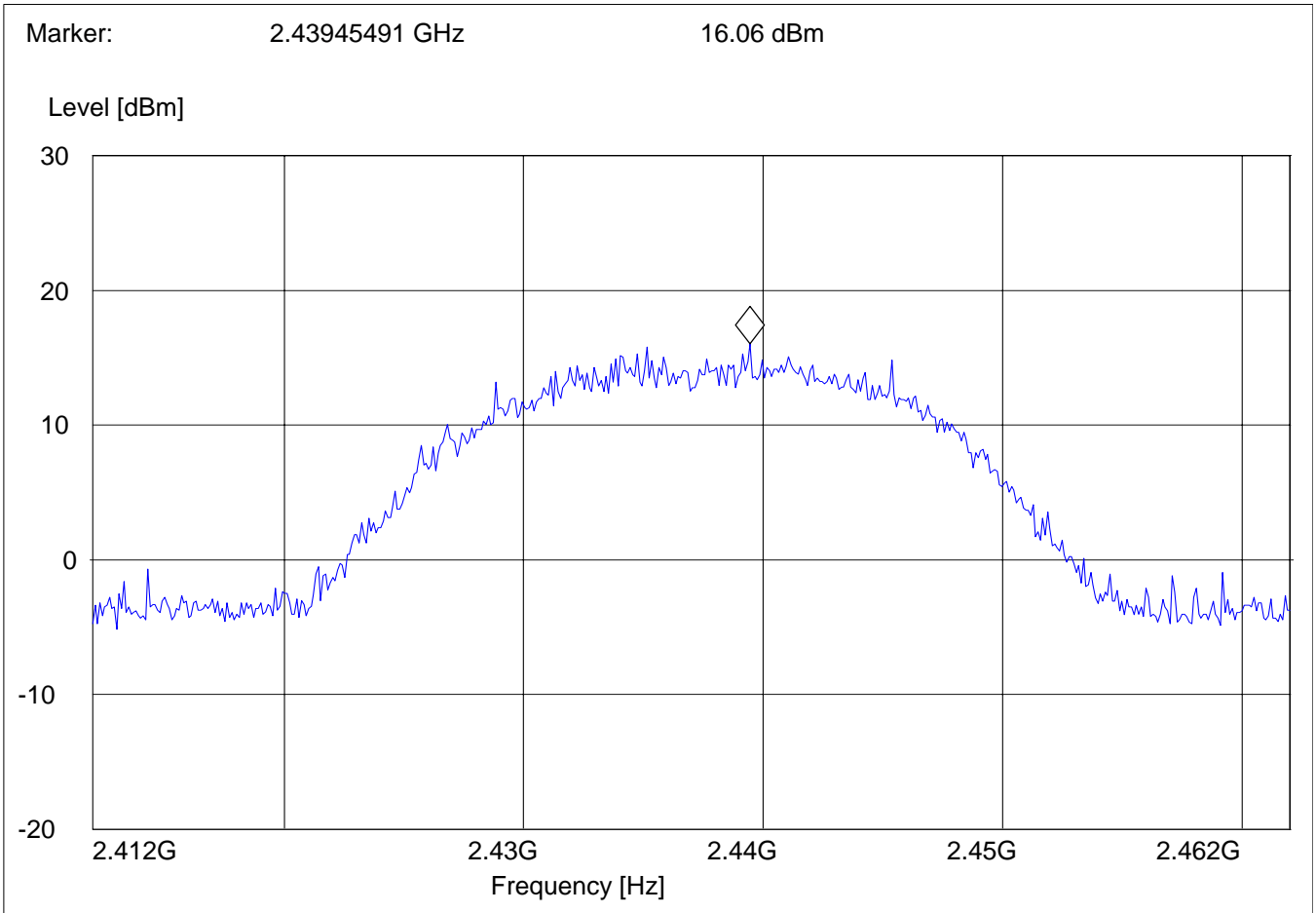
Frequency range	RF power output
2400-2483.5 MHz	30dBm on Conducted

**EIRP LOW CHANNEL  
2412MHz**

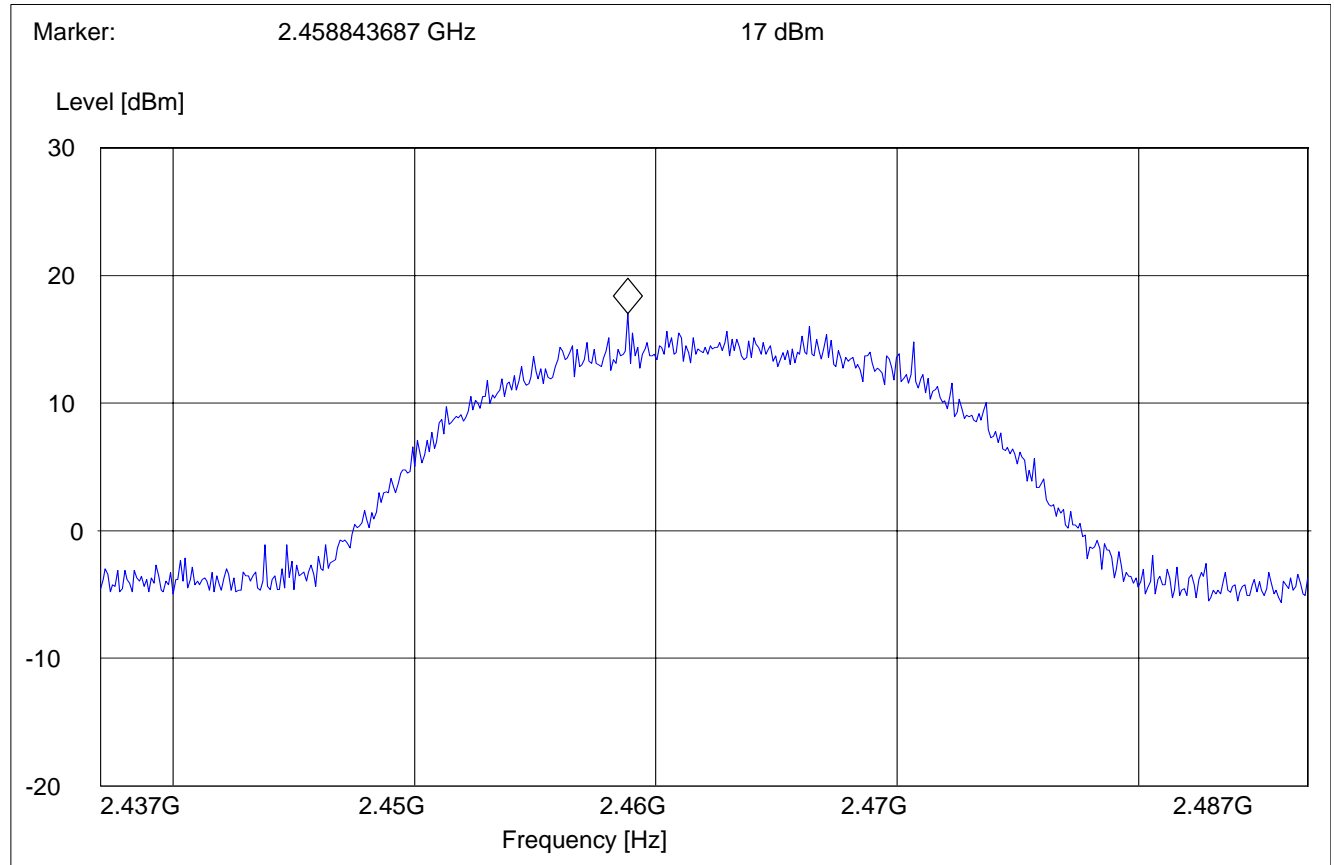




**EIRP MID CHANNEL**  
**2437MHz**



**EIRP HIGH CHANNEL**  
**2462MHz**



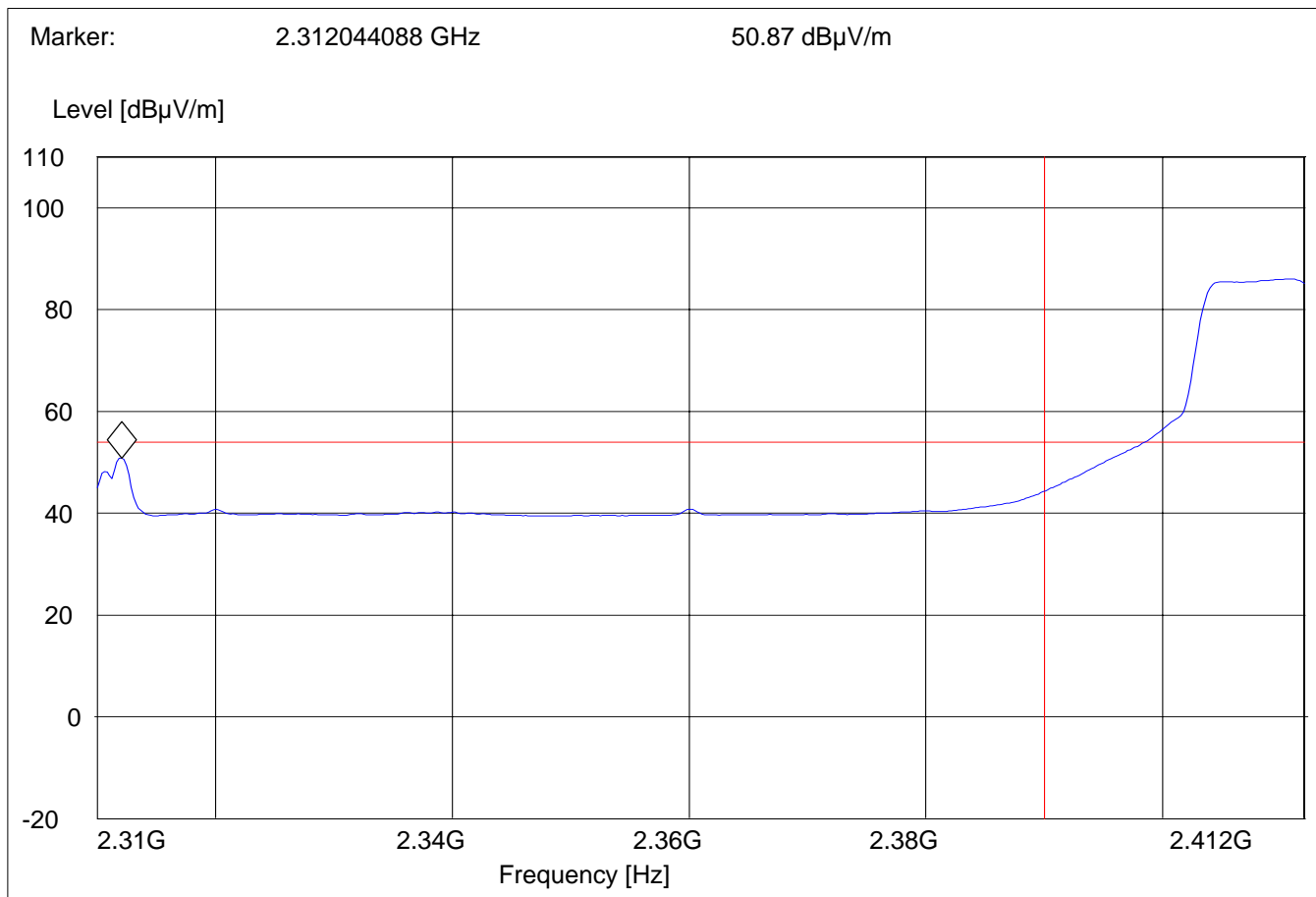
**BAND EDGE COMPLIANCE**

§15.247 (c)

**Low frequency section (spurious in the restricted band 2310 – 2390 MHz)  
(Average measurement @ 6Mbps)**

Operating condition : Tx at 2412MHz  
 SWEEP TABLE : "FCC15.247 LBE\_AVG"  
 Limit Line : 54dBμV

Start Frequency	Stop Frequency	Detector	Meas. Bandw.	RBW	VBW	Transducer
2.31 GHz	2.412 GHz	MaxPeak	Coupled	1 MHz	10Hz	#326 horn (dBi)



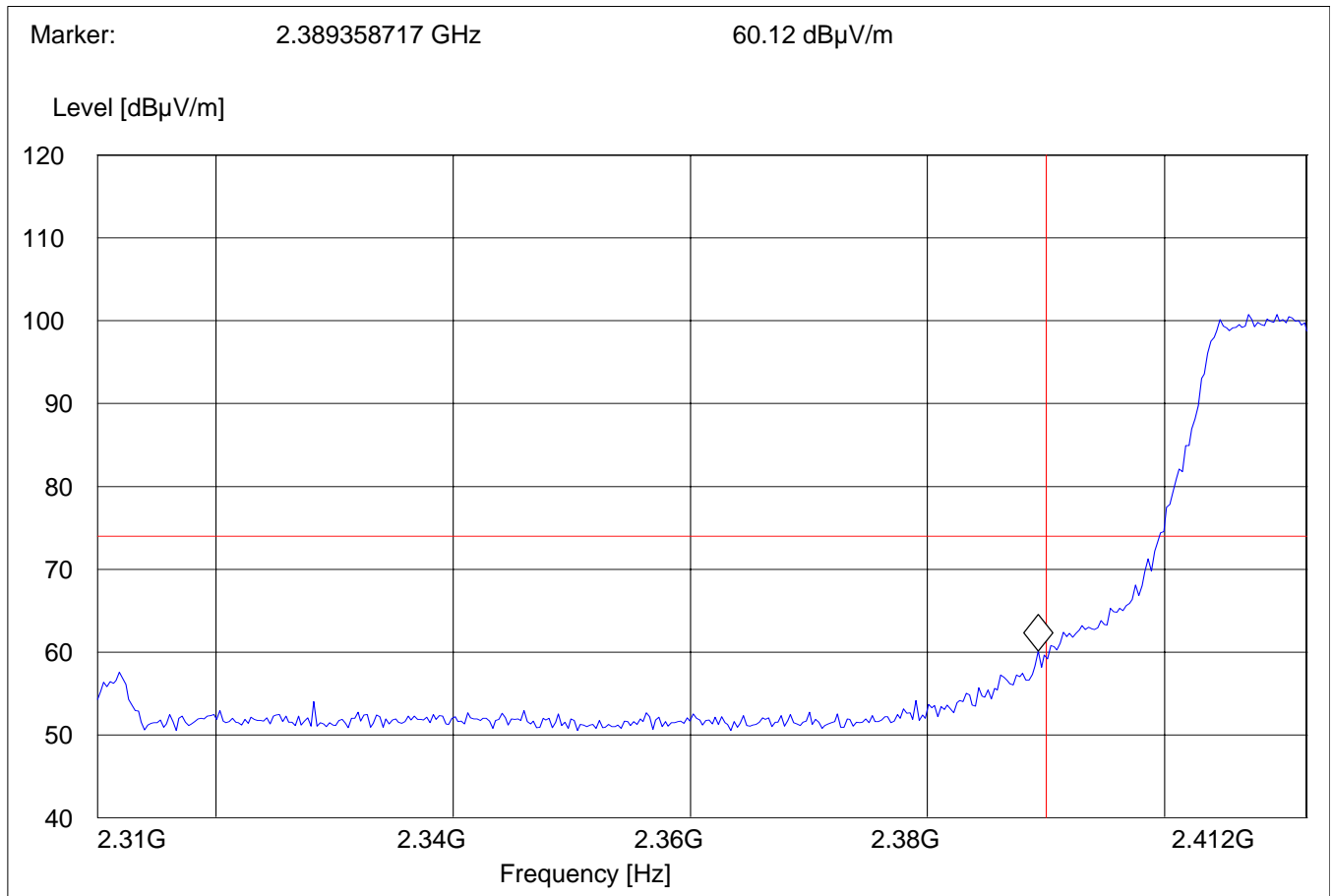
**BAND EDGE COMPLIANCE**

**§15.247 (c)**

**Low frequency section (spurious in the restricted band 2310 – 2390 MHz)  
(Peak measurement @ 54Mbps)**

Operating condition : Tx at 2412MHz  
 SWEEP TABLE : "FCC15.247 LBE\_Pk"  
 Limit Line : 74dBμV

Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer
2.31 GHz	2.412 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)



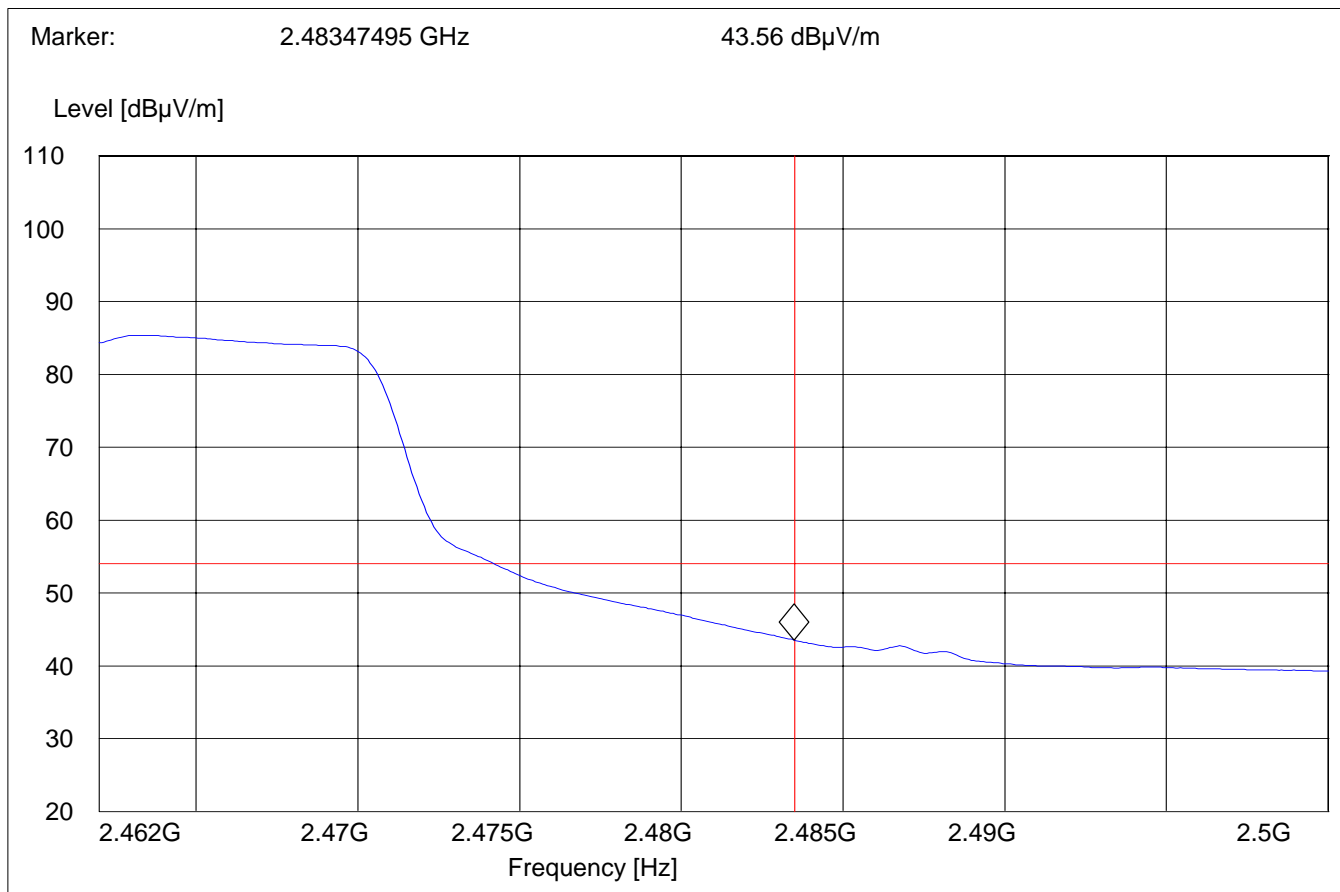
**BAND EDGE COMPLIANCE**

**§15.247 (c)**

**High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)  
(Average measurement @ 6Mbps)**

Operating condition : Tx at 2462MHz  
 SWEEP TABLE : "FCC15.247 HBE\_AVG"  
 Limit Line : 54dBμV

Start Frequency	Stop Frequency	Detector	Meas. Bandw.	RBW	VBW	Transducer
2.462 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	10Hz	#326 horn (dBi)



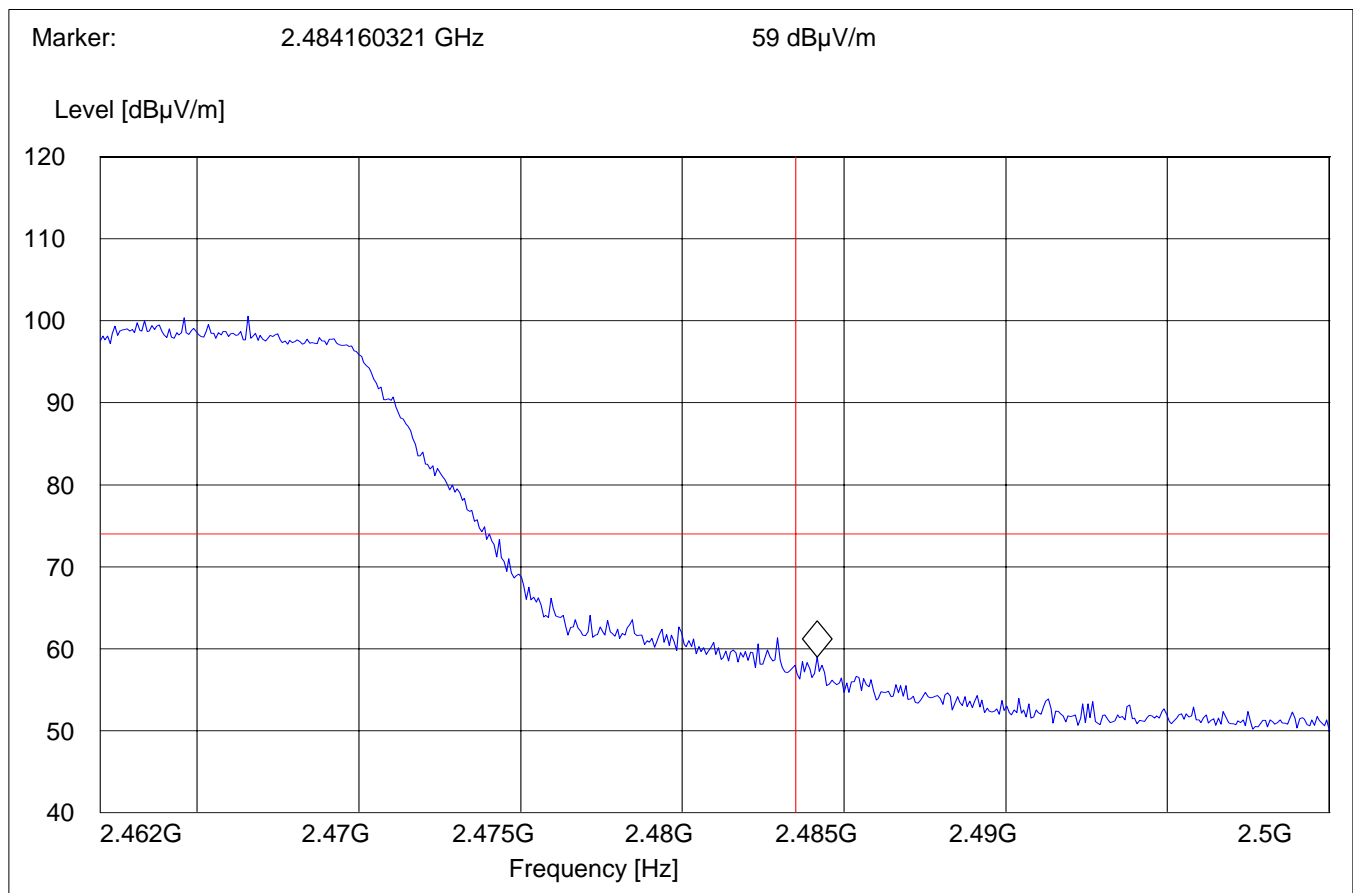
**BAND EDGE COMPLIANCE**

**§15.247 (c)**

**High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)  
(Peak measurement @ 54Mbps)**

Operating condition : Tx at 2462MHz  
 SWEEP TABLE : "FCC15.247 HBE\_PK"  
 Limit Line : 74dBμV

Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer
2.462 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)



**EMISSION LIMITATIONS  
Transmitter (Radiated)**

**§ 15.247 (c) (1)**

**LIMITS**

**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:**

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 unless specified with the plots.

**Results for the radiated measurements below 30MHz according § 15.33**

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

**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

<b>Transmit at Lowest channel Frequency 2412MHz</b>			
<b>Frequency (MHz)</b>	<b>Level (dBµV/m)</b>		
	<b>Peak</b>	<b>Quasi-Peak</b>	<b>Average</b>
See plots			
<b>Transmit at Middle channel Frequency 2437MHz</b>			
<b>Frequency (MHz)</b>	<b>Level (dBµV/m)</b>		
	<b>Peak</b>	<b>Quasi-Peak</b>	<b>Average</b>
See plots			
<b>Transmit at Highest channel Frequency 2462MHz</b>			
<b>Frequency (MHz)</b>	<b>Level (dBµV/m)</b>		
	<b>Peak</b>	<b>Quasi-Peak</b>	<b>Average</b>
See plots			



## EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

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

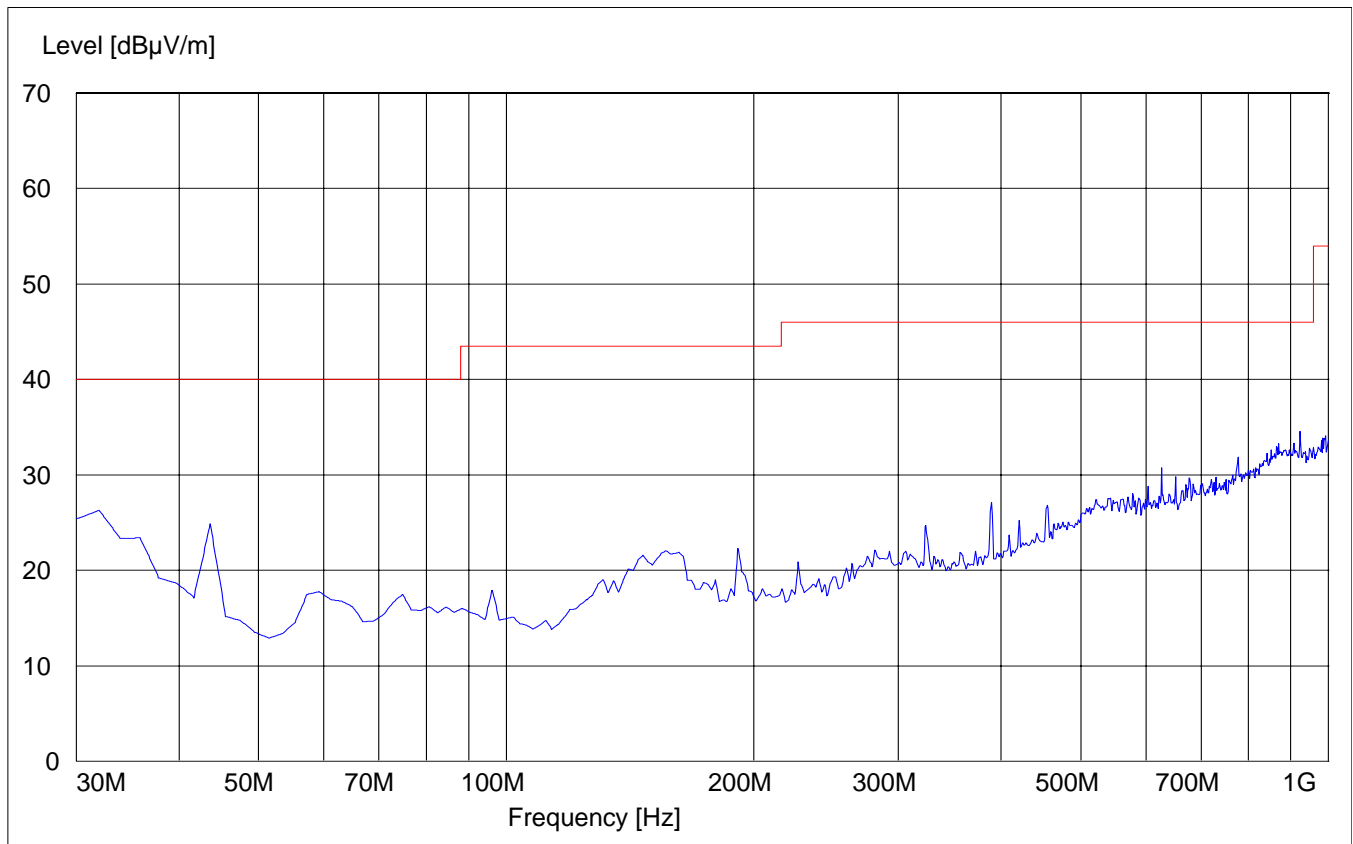
@ 54Mbps

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

### SWEEP TABLE:

"BT Spuri hi 30-1G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186



**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

**Lowest Channel (2412MHz): 1GHz – 3GHz**

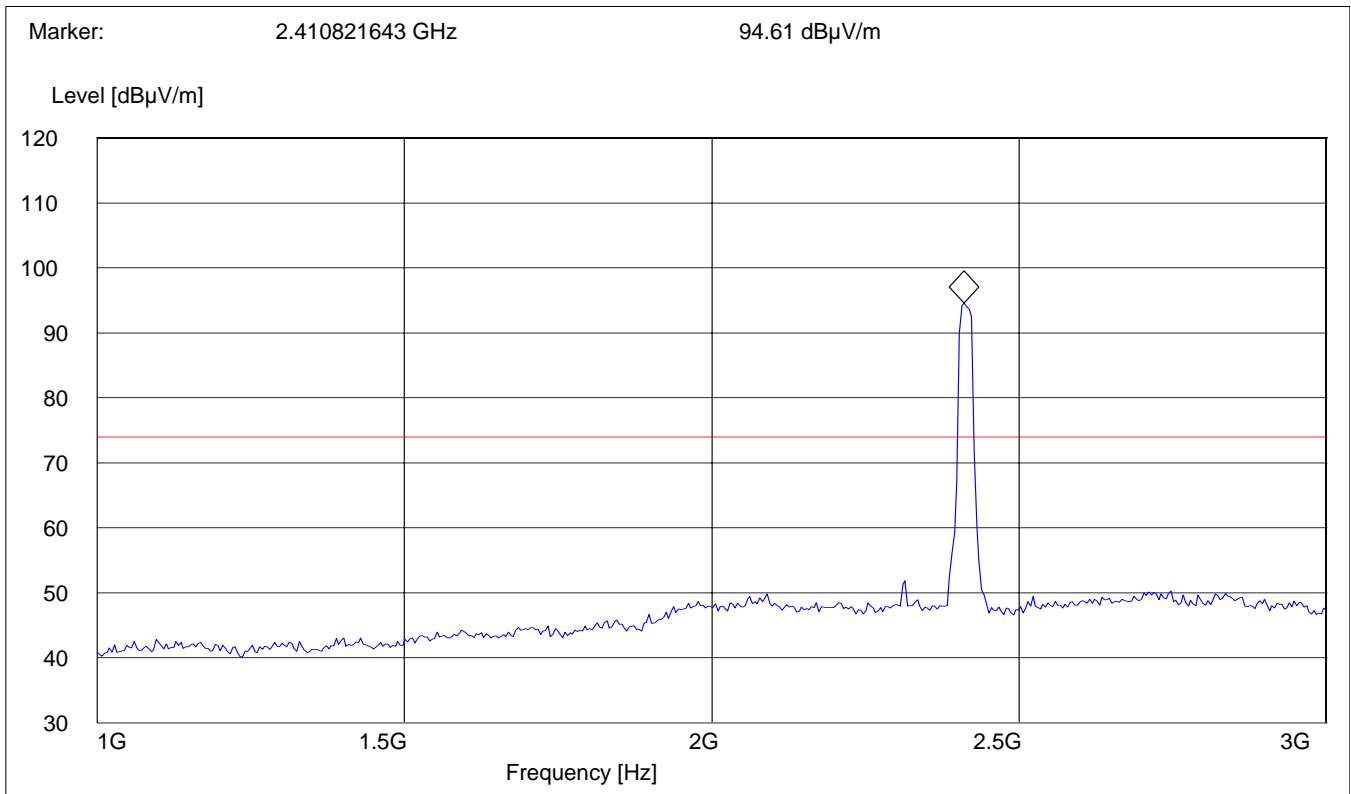
**@ 54Mbps**

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

**SWEEP TABLE:**

"BT Spuri hi 1-3G"

Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)



**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

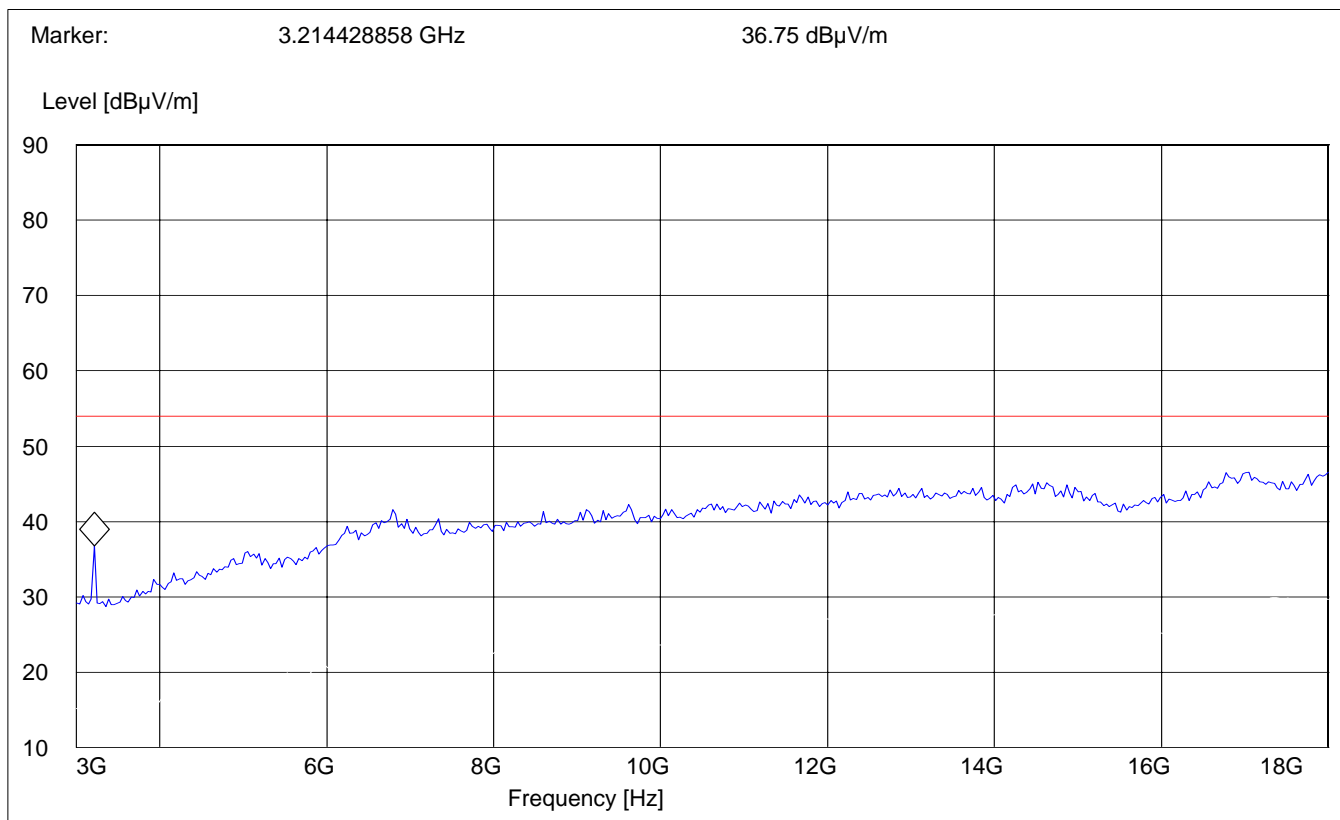
**Lowest Channel (2412MHz): 3GHz – 18GHz**

**@ 54Mbps**

**SWEEP TABLE:**

"BT Spuri hi 3-18G"

Start Frequency	Stop Frequency	Detector Time	Meas. Bandw.	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)



**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

**Mid Channel (2437MHz): 1GHz – 3GHz**

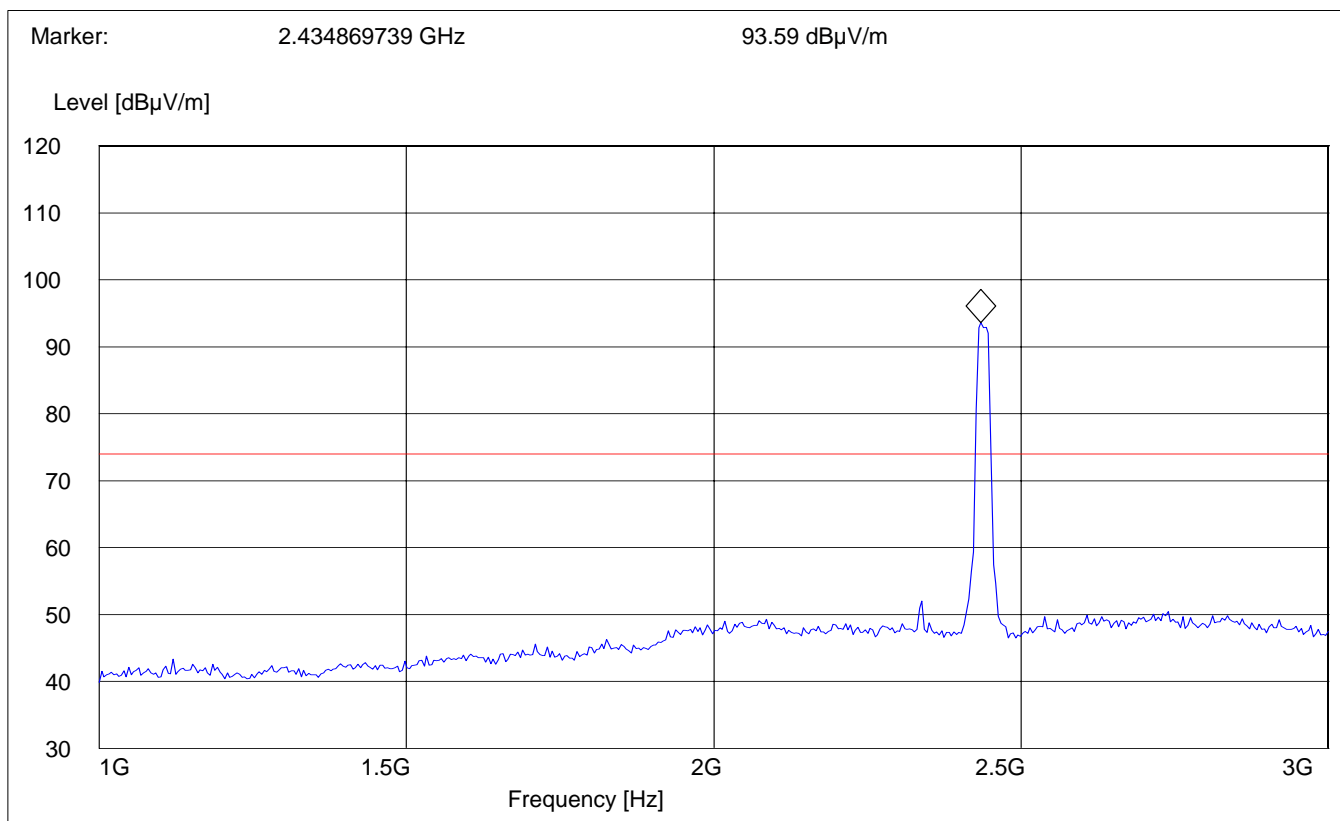
**@ 54Mbps**

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

**SWEEP TABLE:**

"BT Spuri hi 1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	Meas. Bandw.	RBW	VBW	Transducer
1.0 GHz	3.0 GHz	MaxPeak		Coupled	1 MHz	1MHz	#326 horn (dBi)



**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

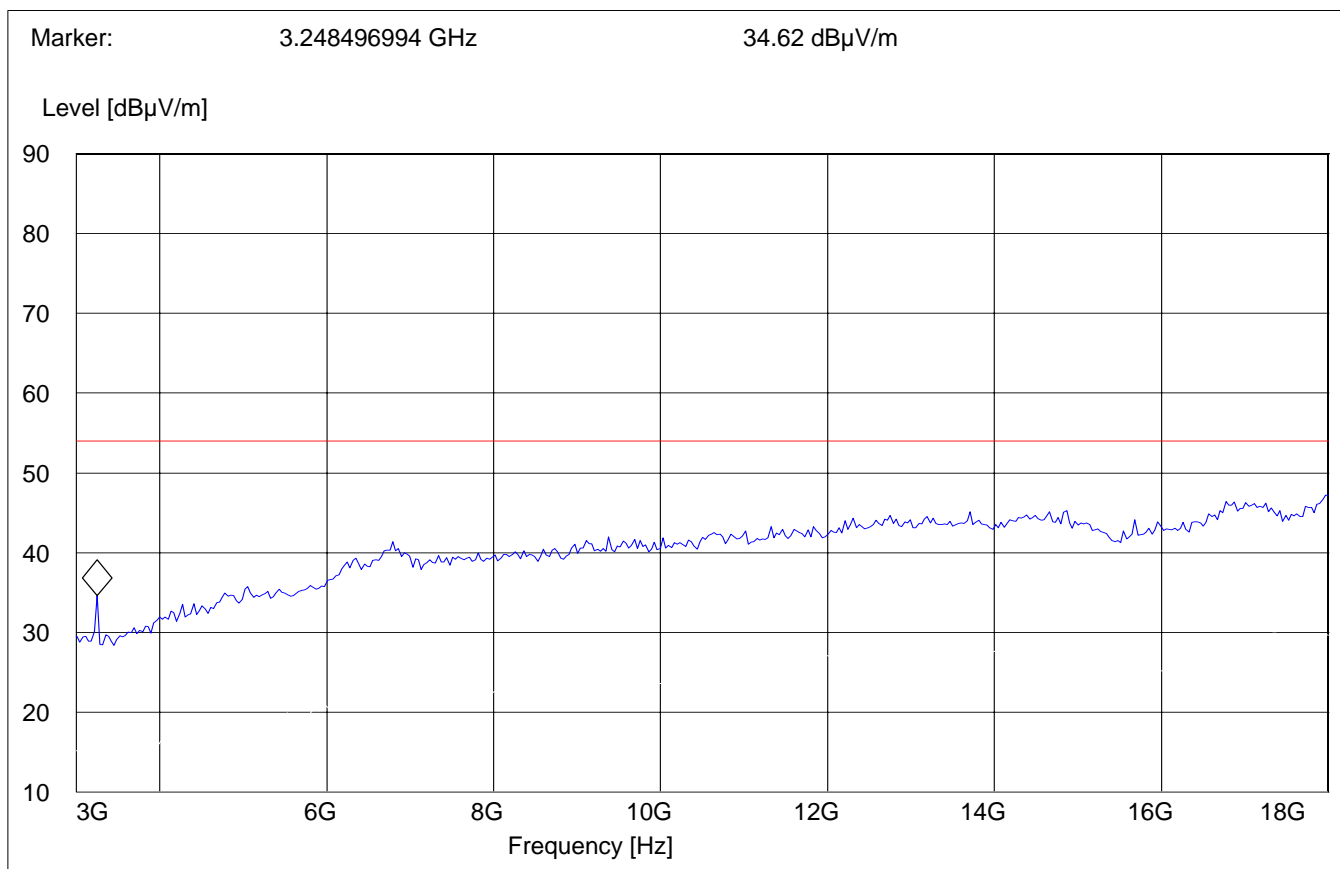
**Mid Channel (2437MHz): 3GHz – 18GHz**

**@ 54Mbps**

**SWEEP TABLE:**

"BT Spuri hi 3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Bandw.	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)



**EMISSION LIMITATIONS - Radiated (Transmitter)**

§ 15.247 (c) (1)

**Highest Channel (2462MHz): 1GHz – 3GHz**

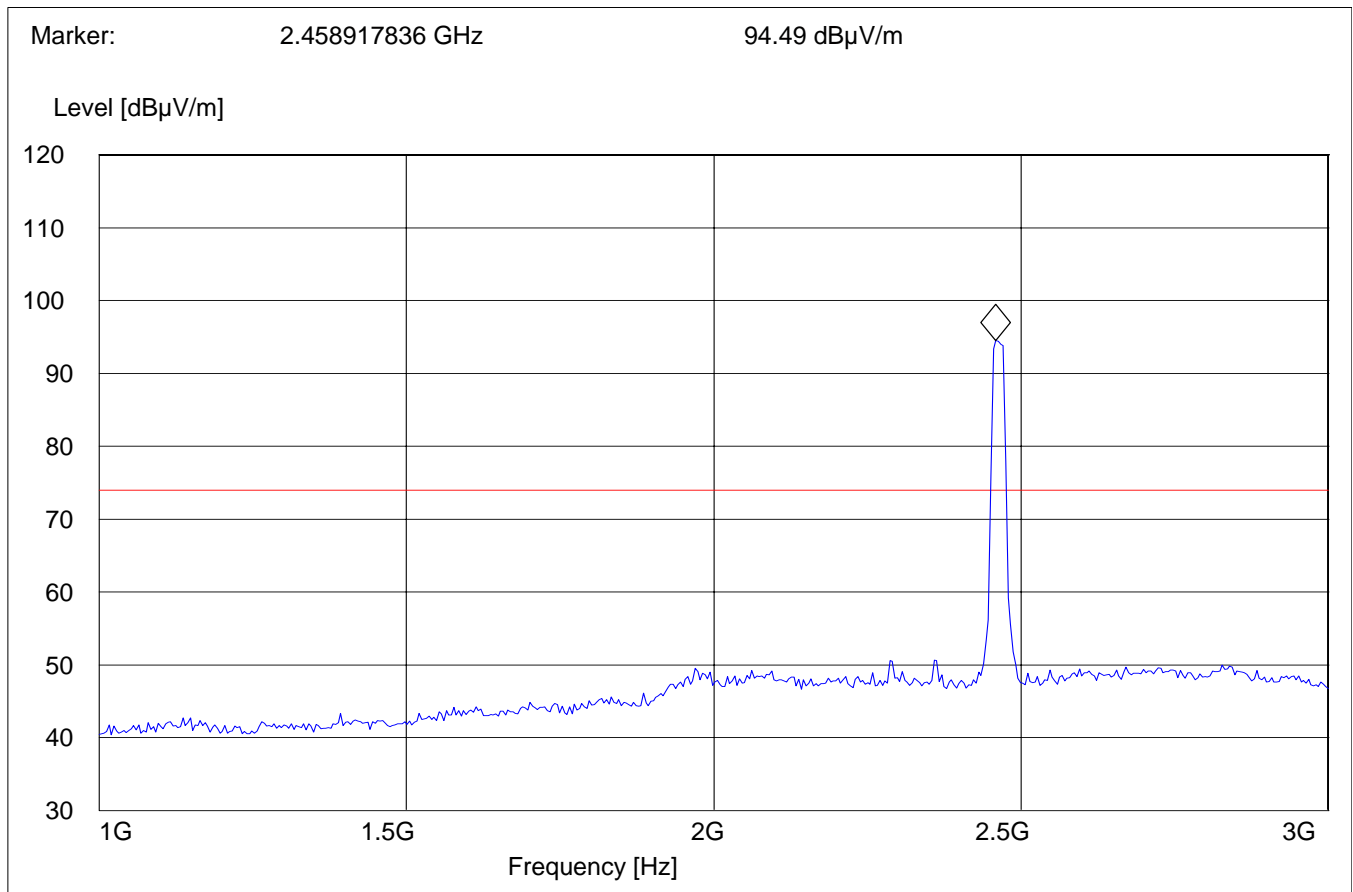
**@ 54Mbps**

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

**SWEEP TABLE:**

"BT Spuri hi 1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	Meas. Bandw.	RBW	VBW	Transducer
1.0 GHz	3.0 GHz	MaxPeak		Coupled	1 MHz	1MHz	#326 horn (dBi)



**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

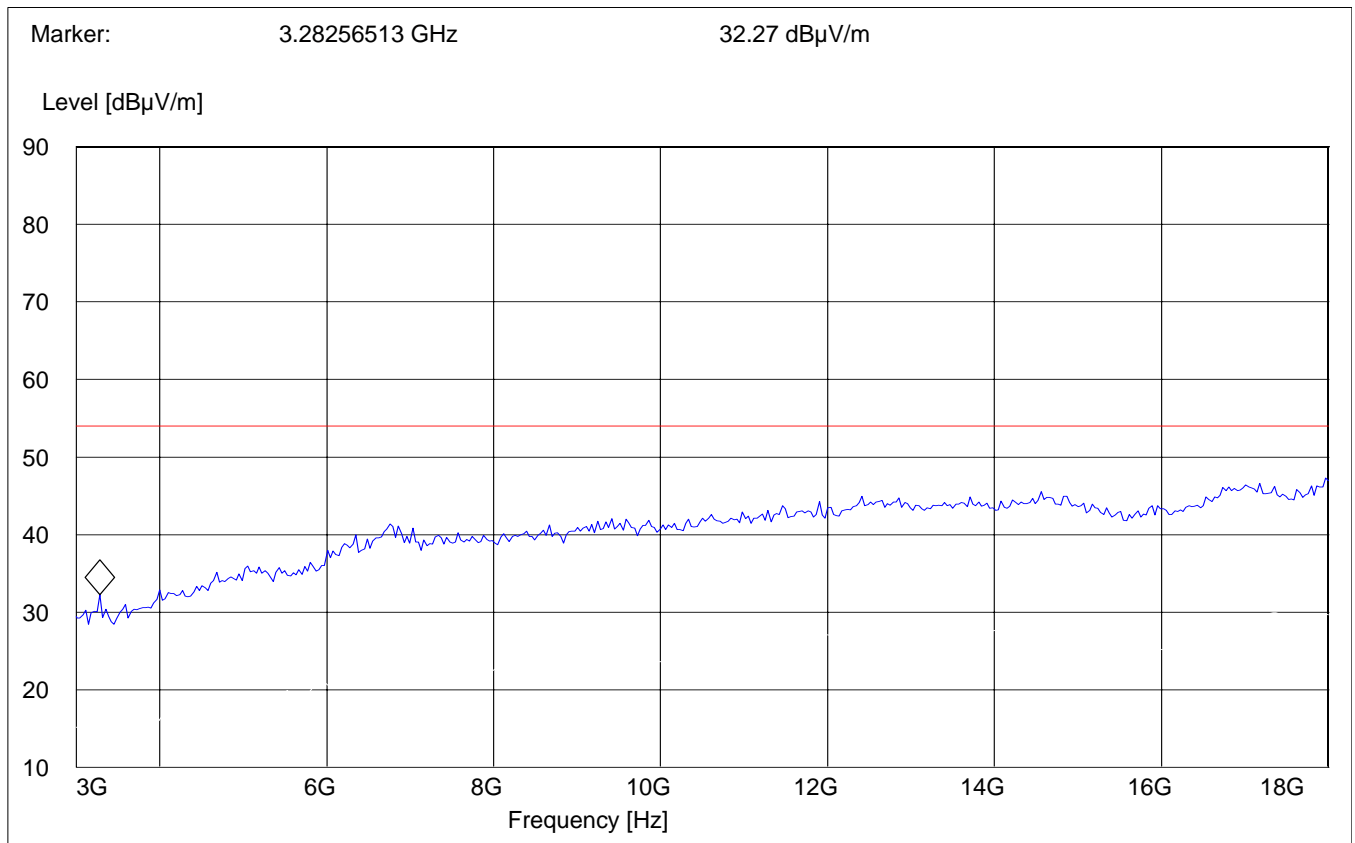
**Highest Channel (2462MHz): 3GHz – 18GHz**

**@ 54Mbps**

**SWEEP TABLE:**

"BT Spuri hi 3-18G"

Start Frequency	Stop Frequency	Detector	Meas. Bandw.	RBW	VBW	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)



**EMISSION LIMITATIONS - Radiated (Transmitter)**

**§ 15.247 (c) (1)**

**18GHz – 26.5GHz**

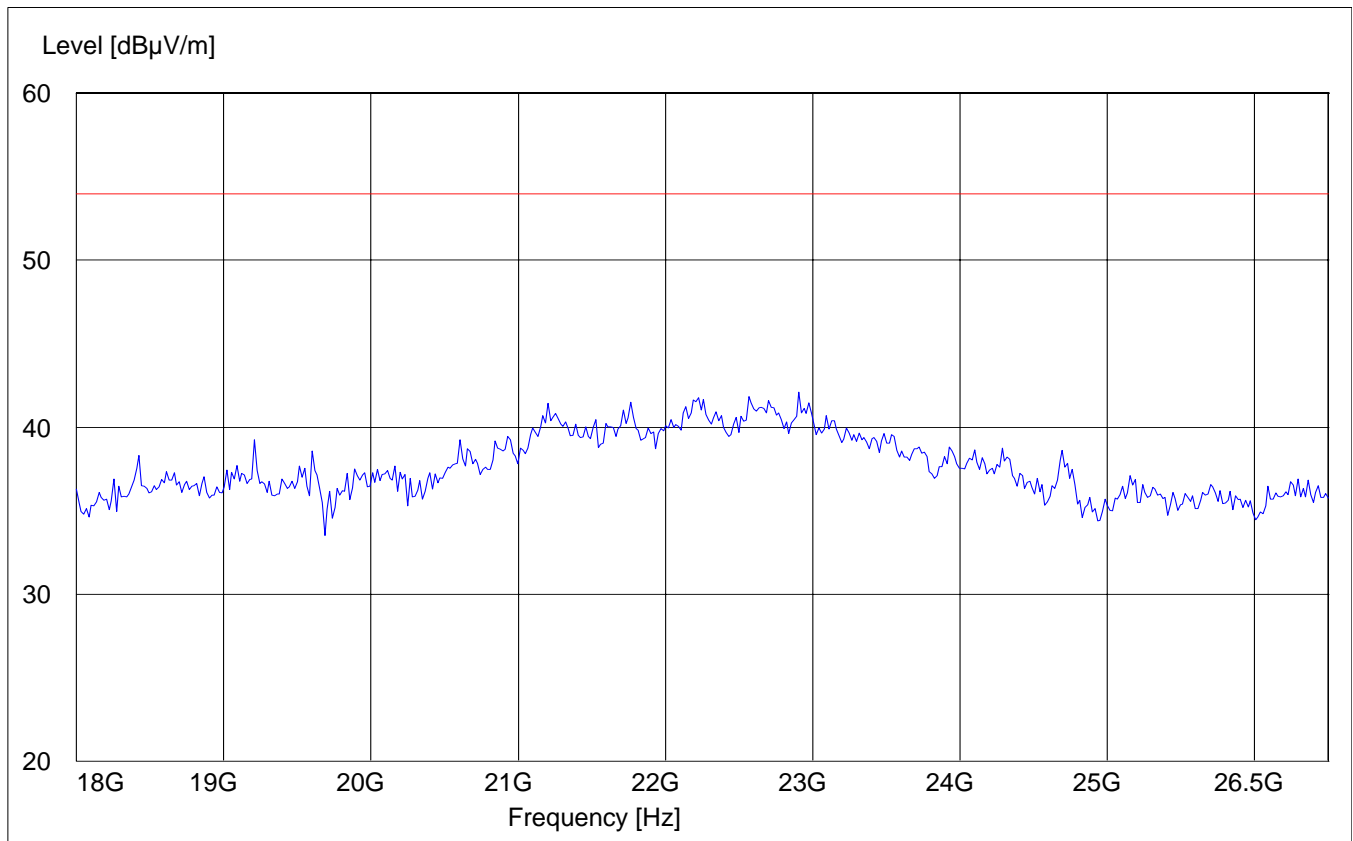
**Note: This plot is valid for low, mid, high channels (worst-case plot)**

**@ 54Mbps**

SWEEP TABLE:

"BT Spuri hi 18-26.5G"

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
18 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)





**CONDUCTED EMISSIONS**

§ 15.107/207

Measured with AC/DC power adapter

SWEEP TABLE: "55022 cond"

Short Description: EN 55022 for 150KHz-30MHz  
 Start Stop Detector Meas IF Transducer  
 Frequency Frequency Time Bandw.  
 150.0 kHz 30.0 MHz MaxPeak Coupled 10 kHz None

Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)

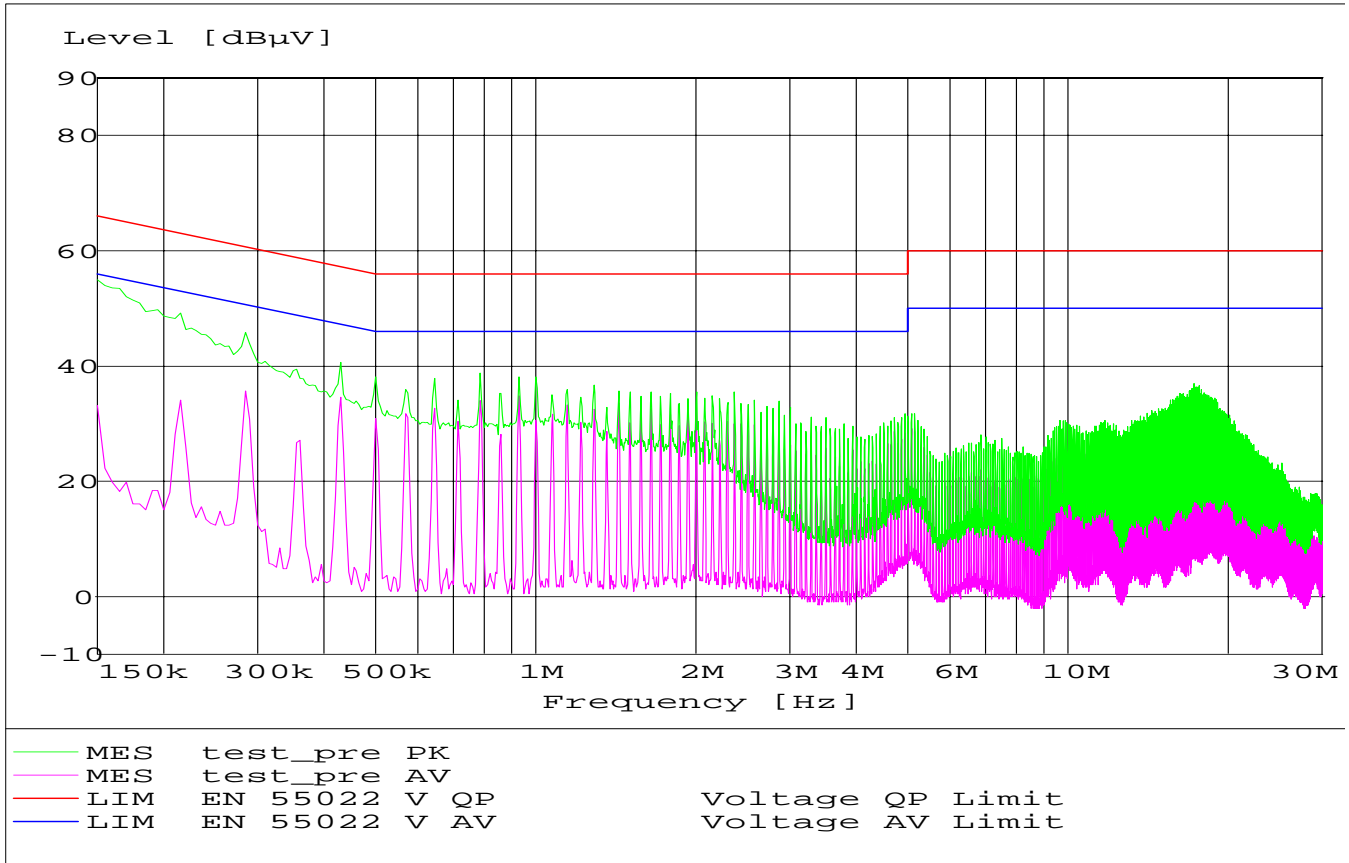
**Limit**

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

\* Decreases with logarithm of the frequency

ANALYZER SETTINGS: RBW = 10KHz

VBW = 10KHz



**RECEIVER SPURIOUS RADIATION**

§ 15.209

**Limits**

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

**NOTE:**

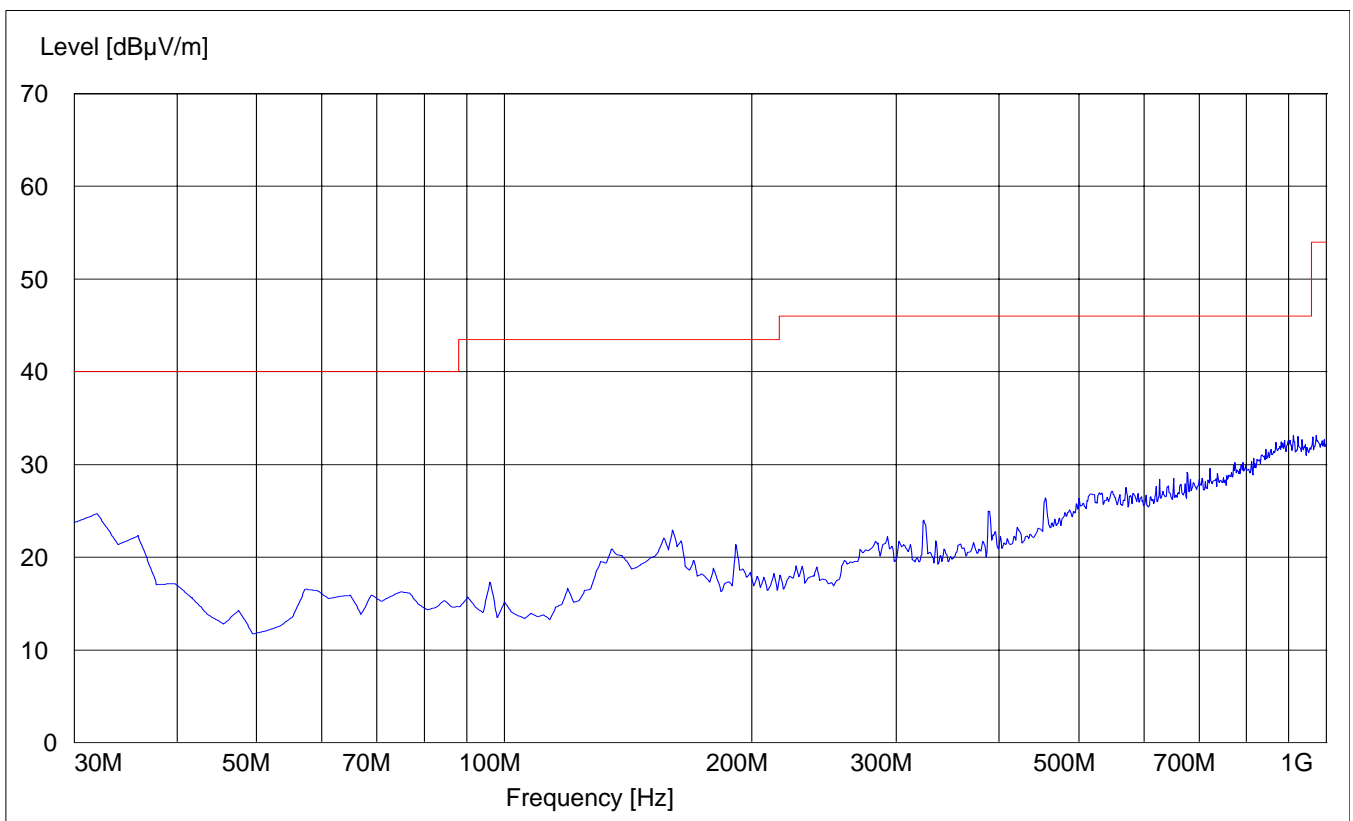
The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.

**RECEIVER SPURIOUS RADIATION**  
**30MHz – 1GHz**

§ 15.209

SWEEP TABLE: " Spuri hi 30-1G"

Start	Stop	Detector	Meas. Time	RBW	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186



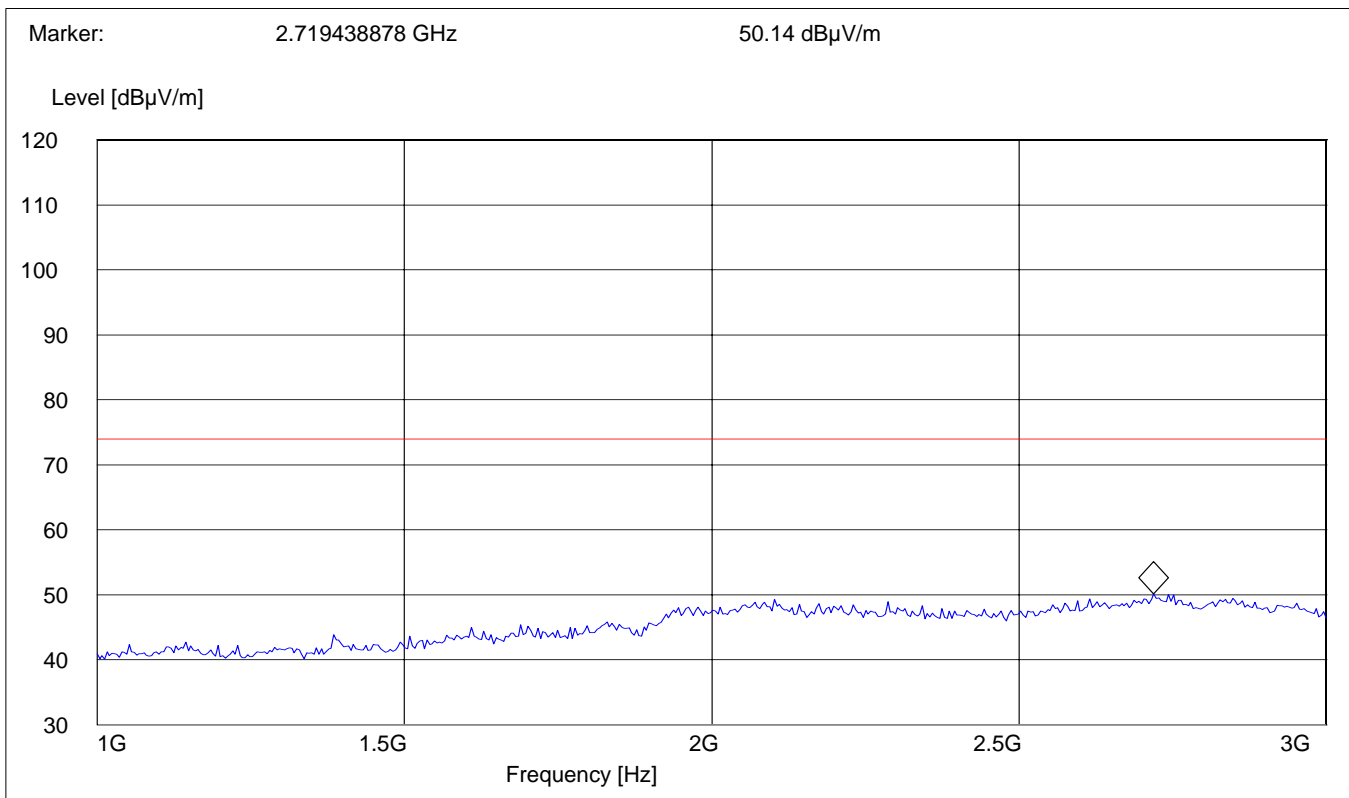
**RECEIVER SPURIOUS RADIATION**  
**1GHz – 3GHz**

**§ 15.209**

**SWEEP TABLE:**

Start	Stop	Detector	Meas.	RBW	VBW	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	1MHz	#326 horn (dBi)

"Spuri hi 1-3G"

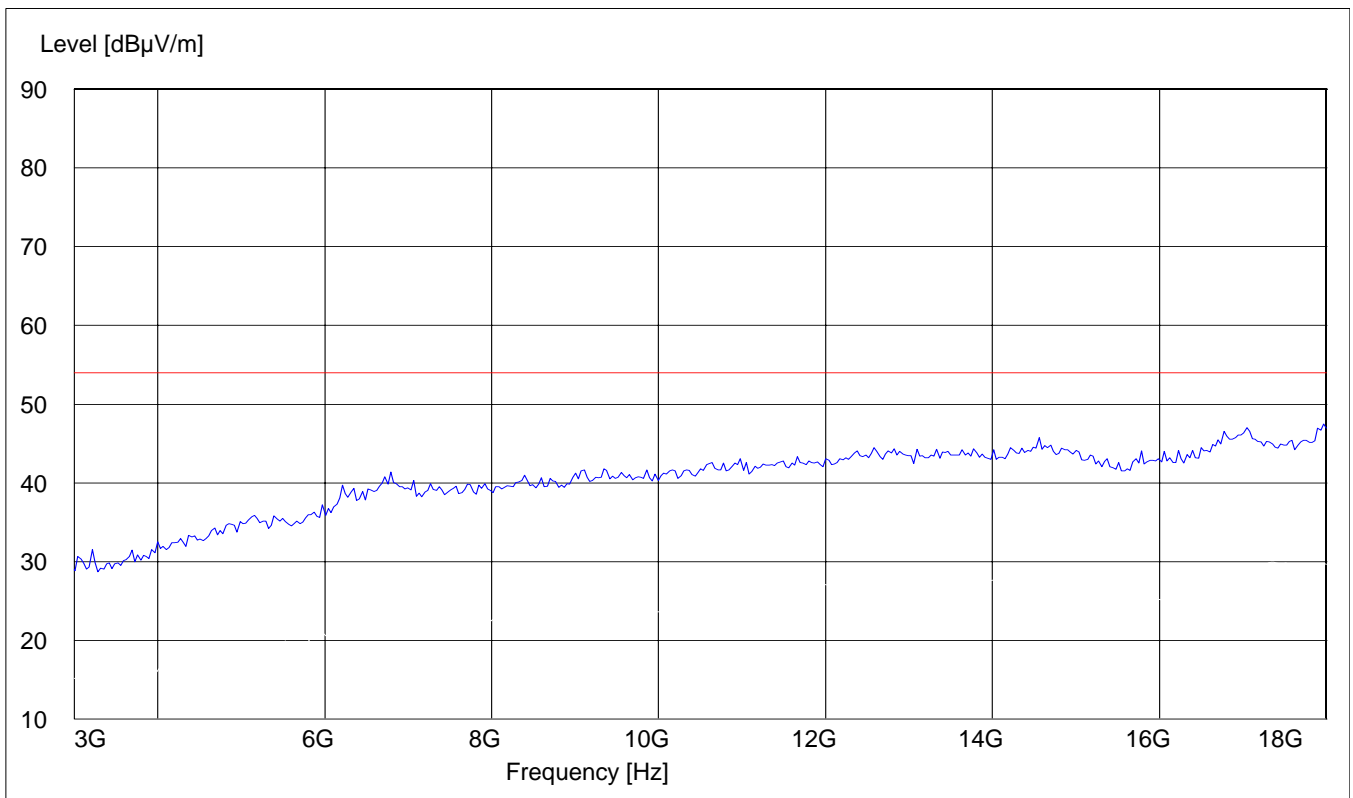


**RECEIVER SPURIOUS RADIATION**  
**3GHz – 18GHz**

§ 15.209

SWEEP TABLE: "Spuri hi 3-18G"

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
3.0 GHz	18 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)

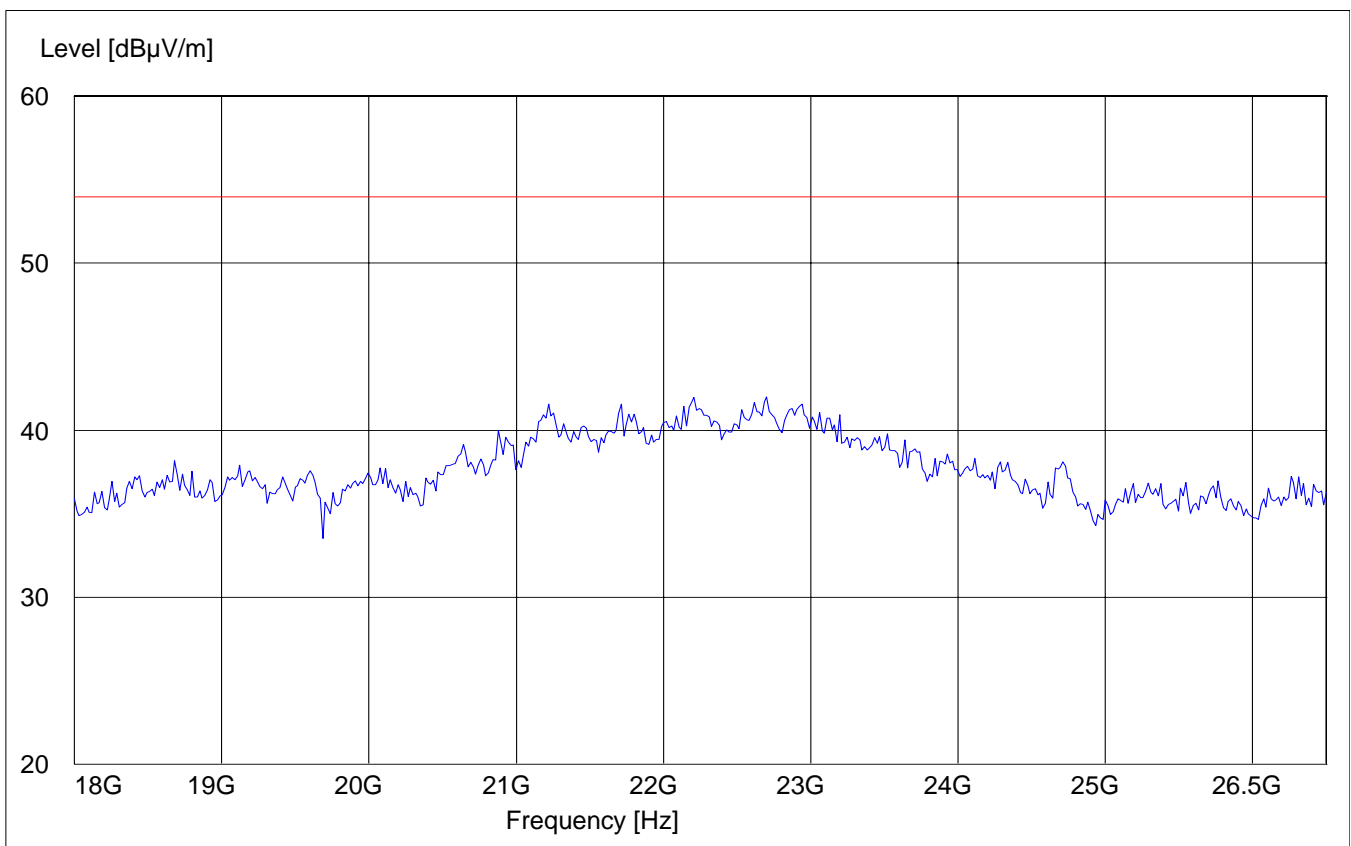


**RECEIVER SPURIOUS RADIATION**  
**18GHz – 26.5GHz**

§ 15.209

SWEEP TABLE: "Spuri hi 18-26.5G"

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
18 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	#141 horn (dBi)



**TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

<b>No</b>	<b>Instrument/Ancillary</b>	<b>Type</b>	<b>Manufacturer</b>	<b>Serial No.</b>
<b>01</b>	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107
<b>02</b>	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	826880/010
<b>03</b>	Biconilog Antenna	3141	EMCO	0005-1186
<b>04</b>	Horn Antenna (700M-18GHz)	SAS-200/571	AH Systems	325
<b>05</b>	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240
<b>06</b>	2-3GHz Band reject filter	BRM50701	Microtronics	6
<b>07</b>	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02
<b>08</b>	Pre-Amplifier	TS-ANA	Rohde & Schwarz	--
<b>09</b>	Pre-Amplifier	JS4-00102600	Miteq	00616

**BLOCK DIAGRAMS**  
**Radiated Testing**

**ANECHOIC CHAMBER**

