



FCC Test Report

Test report no.: EMC_624FCC15.247_2004_COLLOC

FCC Part 15.247 for DSSS systems / CANADA RSS-210
Model: MBS1000-2
FCC ID: P5IMBS2A
IC ID: 1478A-MBS2A



TTI-P-G 081/94-A0

Accredited according to **ISO/IEC 17025**



**Bluetooth Qualification
Test Facility
(BQTF)**



FCC listed # 101450

IC recognized # 3925

CETECOM Inc.

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1	General information
1.1	Notes

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 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.

TEST REPORT PREPARED BY:**EMC Engineer: Harpreet Sidhu**

1.2 Testing laboratory
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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 : Wireless Matrix Corporation
Street : 12369-B Sunrise Valley Drive
City / Zip Code : Reston, VA 20164
Country : USA
Contact : Darryl Strucko
Telephone : 703 262 4021
Tele-fax : 703 262 3085
e-mail : darryl.strucko@wrx-us.com

1.4 Application details

Date of receipt test item : 2004-03-01
Date of test : 2004-03-01/02/03

1.5 Test item

Manufacturer : Applicant
Marketing Name : Mobile Base Station 2
Model No. : MBS1000-2
Description : [Mobile base station with GSM 850/1900, WLAN 802.11b & Satellite Transmitters.](#)
FCC-ID : **P5IMBS2A**
IC-ID : **1478A-MBS2A**

Additional information

Frequency : 824.2MHz – 848.8MHz for GSM 850,
1850.2MHz – 1909.8MHz for PCS 1900
2412MHz – 2462MHz for WLAN
Tx 1626.5MHz – 1660.5MHz for Satellite
Rx 1525MHz – 1559MHz for Satellite
Power supply : 13.6VDC Nominal voltage
Extreme temp. Tolerance : Lower: -20°C Upper: +60°C

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

[This test report is generated in order to show compliance with FCC 15.209 Limits for Collocation of GSM, WLAN & Satellite transmitters. FCC 15.209 limits are considered to be more stringent, therefore EUT compliance with these limits in collocation environment is considered to be compliant with all other sections.](#)

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")

Passed

Technical responsibility for area of testing:

2004-03-12 EMC & Radio Lothar Schmidt (Manager)



Date

Section

Name

Signature

Responsible for test report and project leader:

2004-03-12 EMC & Radio Harpreet Sidhu (EMC Engineer)



Date

Section

Name

Signature

2.2 Test report

TEST REPORT

Test report no.: EMC_624FCC15.247_2004_COLLOC

TEST REPORT REFERENCE

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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

Frequency	Measured values	Remarks
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)**

All Transmitters Transmit at Lowest channel			
Frequency (MHz)	Level (dBµV/m)		
	Peak	Quasi-Peak	Average
3180	47.89		30.14
3248	56.27		32.29
3691	45.54		25.04
4030	52.79		41.74
4863	49.30		28.50
7388	47.99		31.13
All Transmitters Transmit at Middle channel			
Frequency (MHz)	Level (dBµV/m)		
	Peak	Quasi-Peak	Average
3240	51.09		29.05
4893	50.86		29.58
7509	45.38		30.35
All Transmitters Transmit at Highest channel			
Frequency (MHz)	Level (dBµV/m)		
	Peak	Quasi-Peak	Average
3240	48.89		26.38
3300	52.88		29.49
4112	53.65		41.59
5705	54.59		30.54

EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

Lowest Channel: 30MHz – 1GHz

Antenna: Vertical

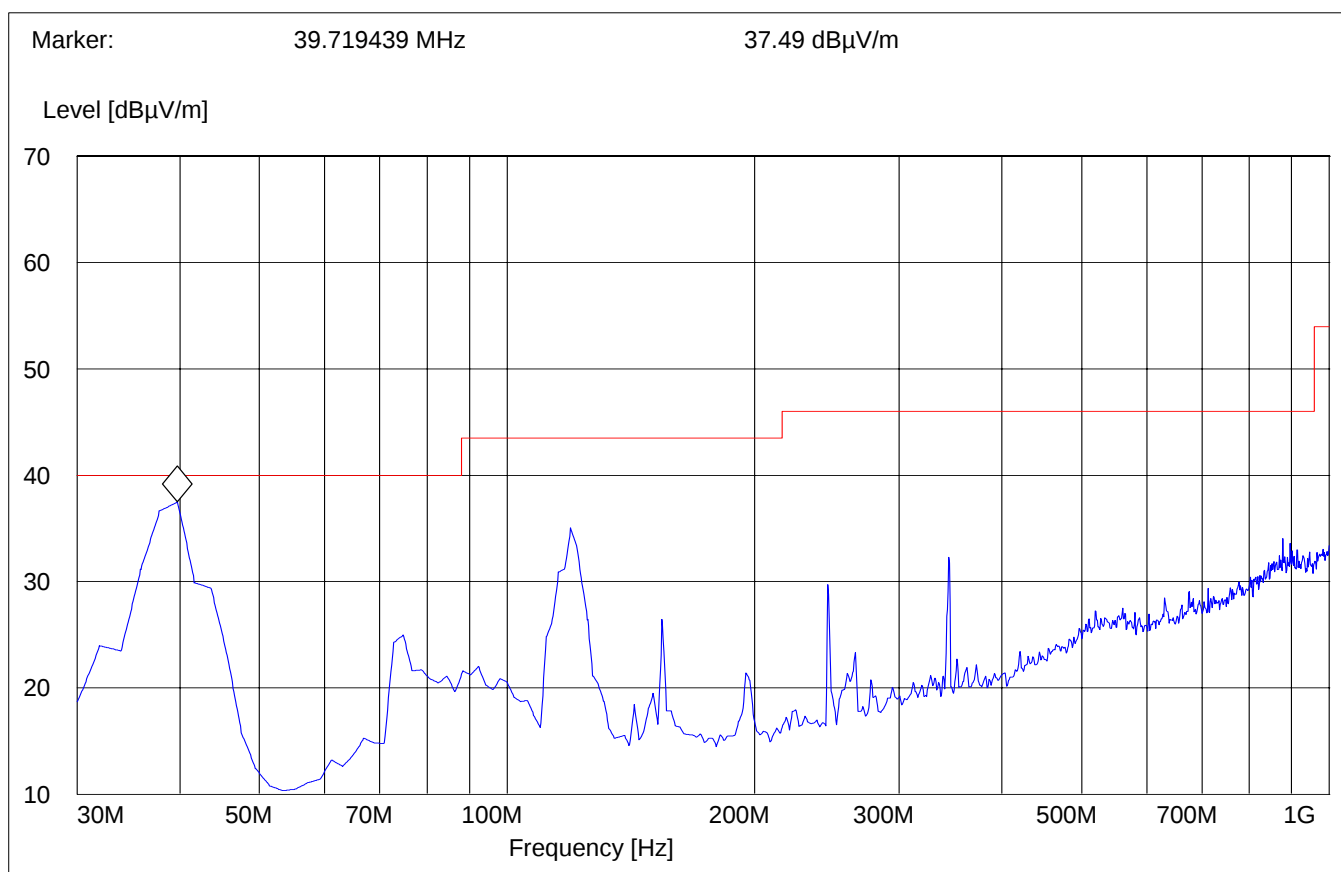
ALL TRANSMITTERS TRANSMITTING AT LOW CHANNEL

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

SWEEP TABLE:

"FCC Spuri hi 30-1G"

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



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

Lowest Channel: 30MHz – 1GHz

Antenna: Horizontal

ALL TRANSMITTERS TRANSMITTING AT LOW CHANNEL

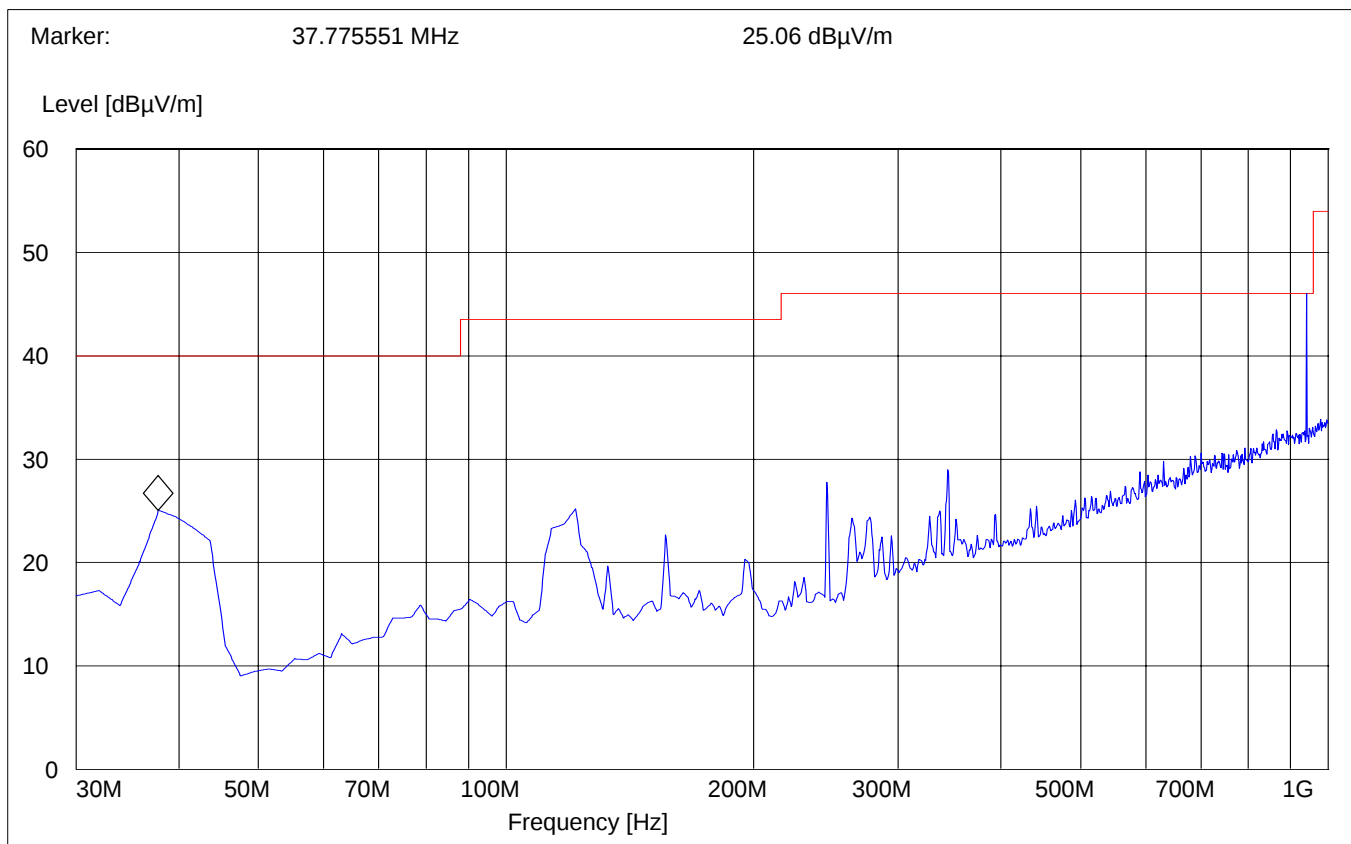
Note:

1. This plot is valid for low, mid, high channels (worst-case plot)
2. Peak touching the limit line is an ambient signal.

SWEEP TABLE:

"FCC Spuri hi 30-1G"

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



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

Lowest Channel: 1GHz – 3GHz

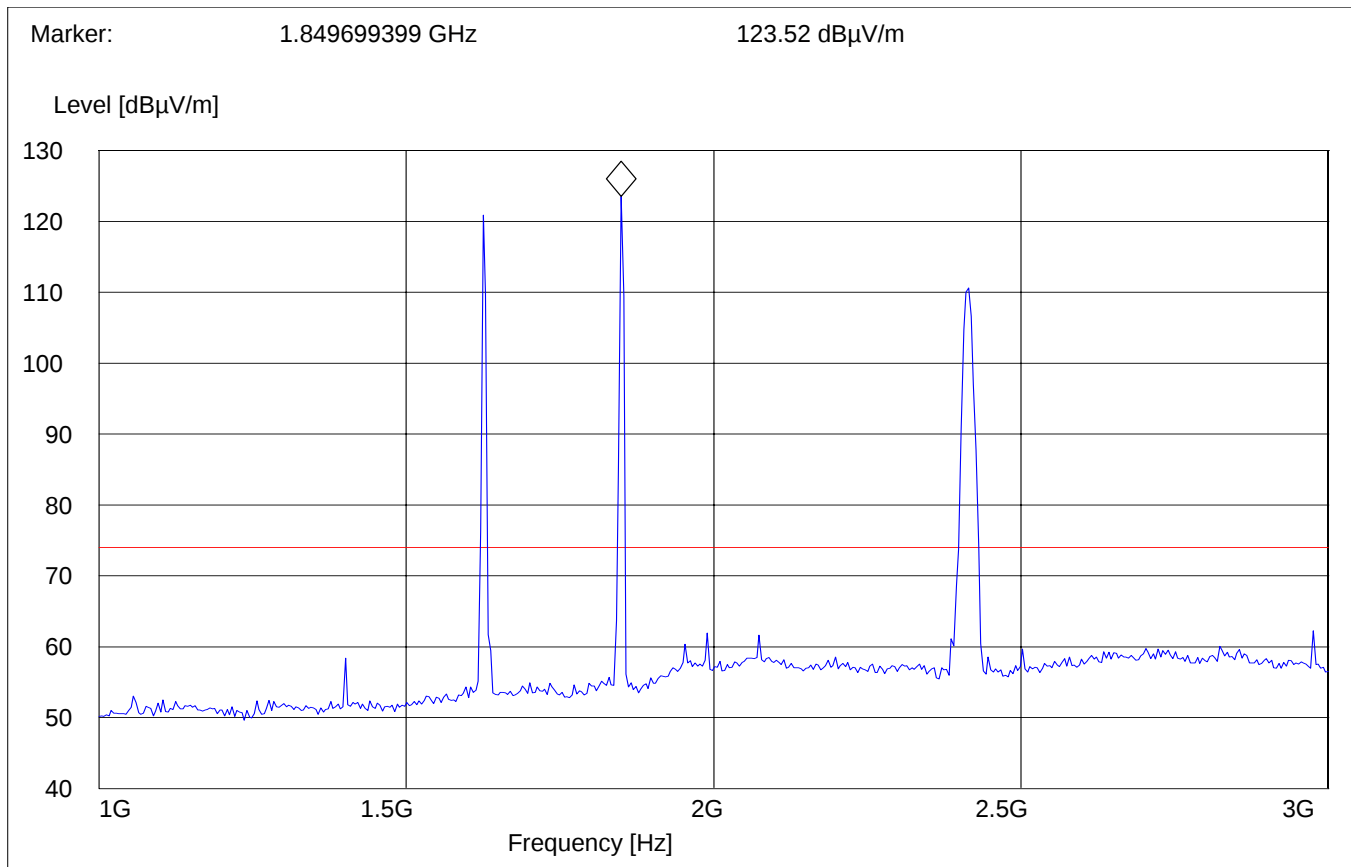
ALL TRANSMITTERS TRANSMITTING AT LOW CHANNEL

Note: Peaks above the limit line are carrier frequencies of GSM 1900, Satellite & WLAN transmitters transmitting at low channel respectively.

SWEEP TABLE:

"FCC 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	#326 horn (dBi)



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

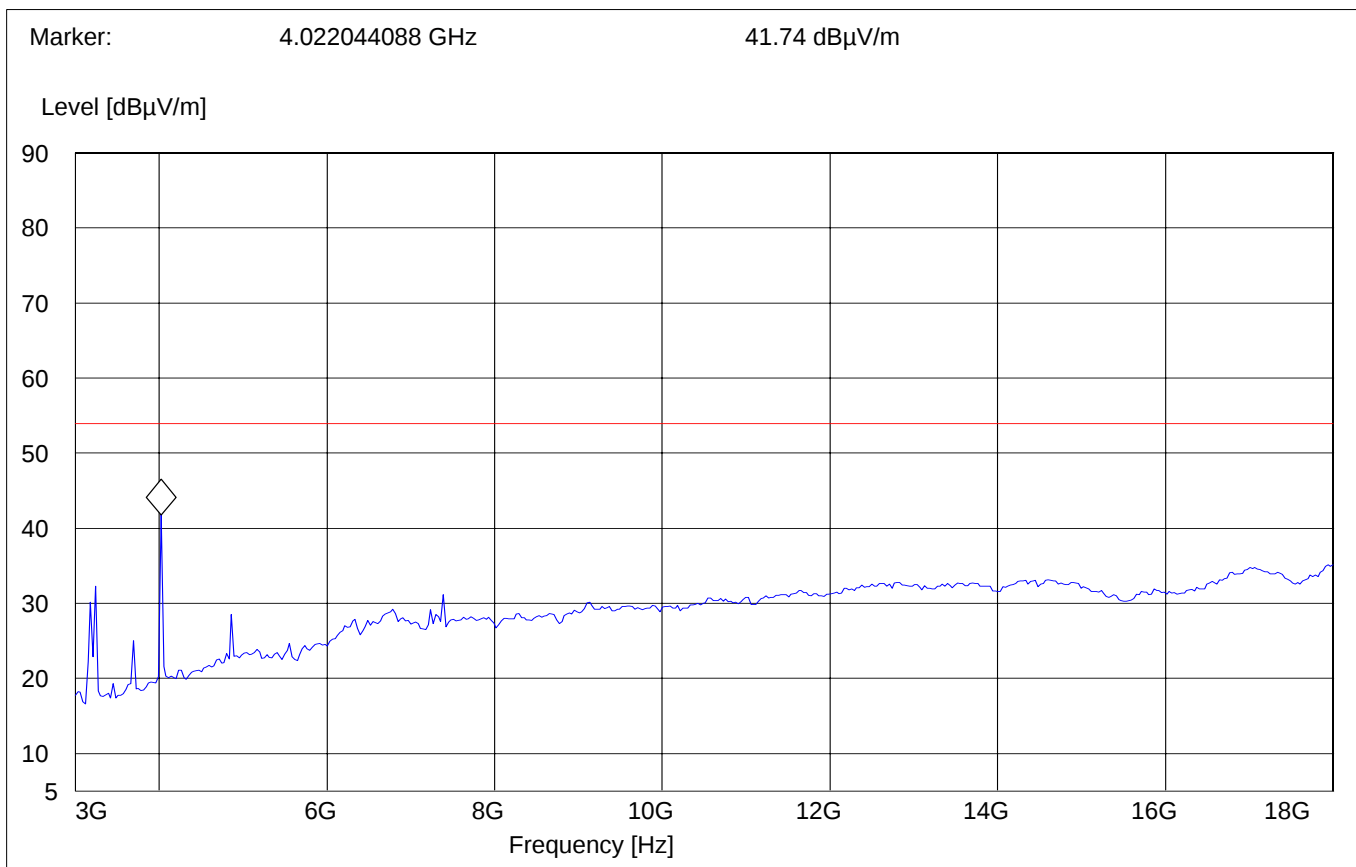
Lowest Channel: 3GHz – 18GHz

ALL TRANSMITTERS TRANSMITTING AT LOW CHANNEL

Average measurement

SWEEP TABLE: "FCC Spuri hi 3-18G"

Start	Stop	Detector	Meas.	RBW	VBW	Transducer
Frequency	Frequency	Time	Bandw.			
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	10Hz	#326 horn (dBi)



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

Mid Channel: 1GHz – 3GHz

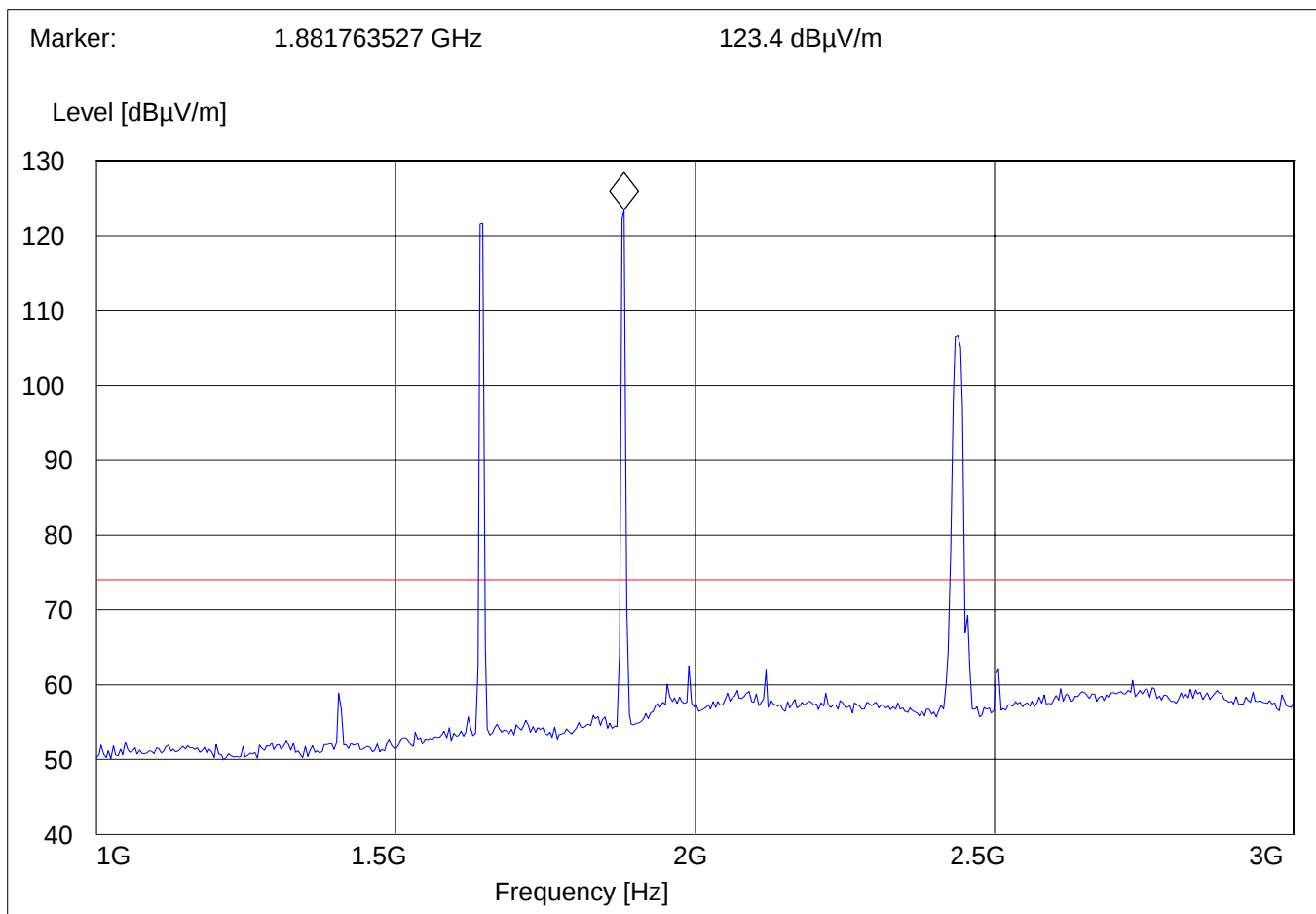
ALL TRANSMITTERS TRANSMITTING AT MID CHANNEL

Note: Peaks above the limit line are carrier frequencies of GSM 1900, Satellite & WLAN transmitters transmitting at Mid channel respectively.

SWEEP TABLE:

"FCC Spuri hi 1-3G"

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



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

Mid Channel: 3GHz – 18GHz

ALL TRANSMITTERS TRANSMITTING AT MID CHANNEL

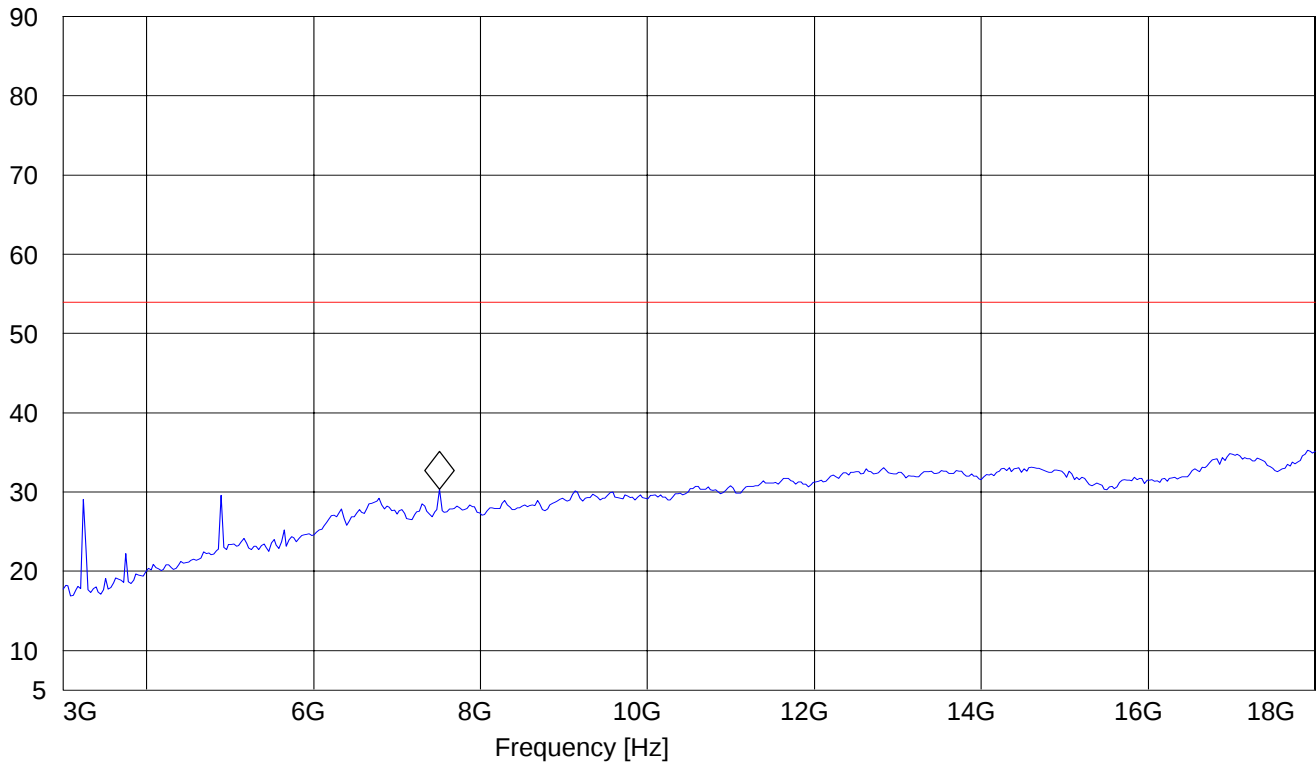
Average measurement

SWEEP TABLE: "FCC Spuri hi 3-18G"

Start	Stop	Detector	Meas.	RBW	VBW	Transducer
Frequency	Frequency	Time	Bandw.			
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	10Hz	#326 horn (dBi)

Marker: 7.509018036 GHz 30.35 dBμV/m

Level [dBμV/m]



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

Highest Channel: 1GHz – 3GHz

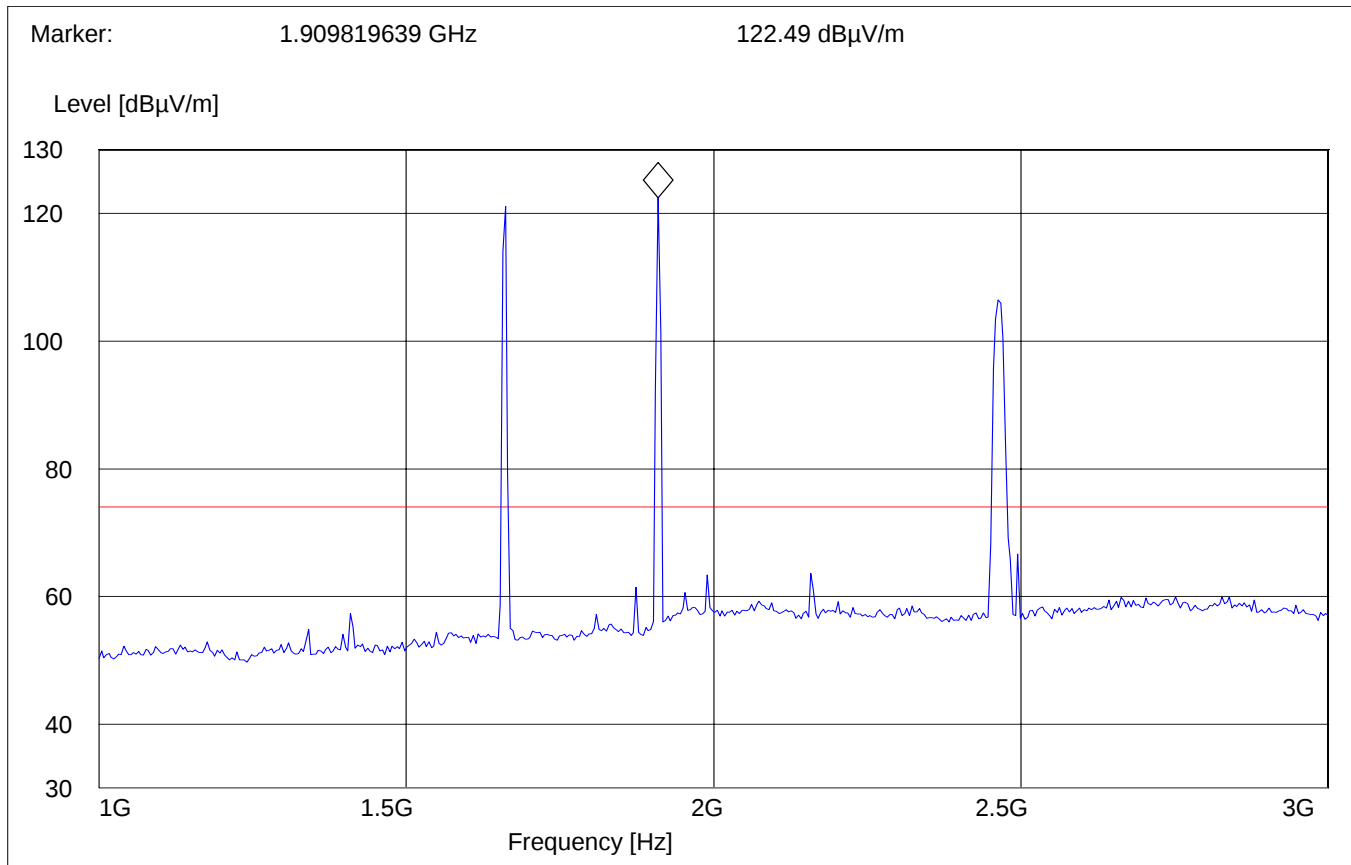
ALL TRANSMITTERS TRANSMITTING AT HIGH CHANNEL

Note: Peaks above the limit line are carrier frequencies of GSM 1900, Satellite & WLAN transmitters transmitting at high channel respectively.

SWEEP TABLE:

"BT Spuri hi 1-3G"

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



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

Highest Channel: 3GHz – 18GHz

ALL TRANSMITTERS TRANSMITTING AT HIGH CHANNEL

SWEEP TABLE:

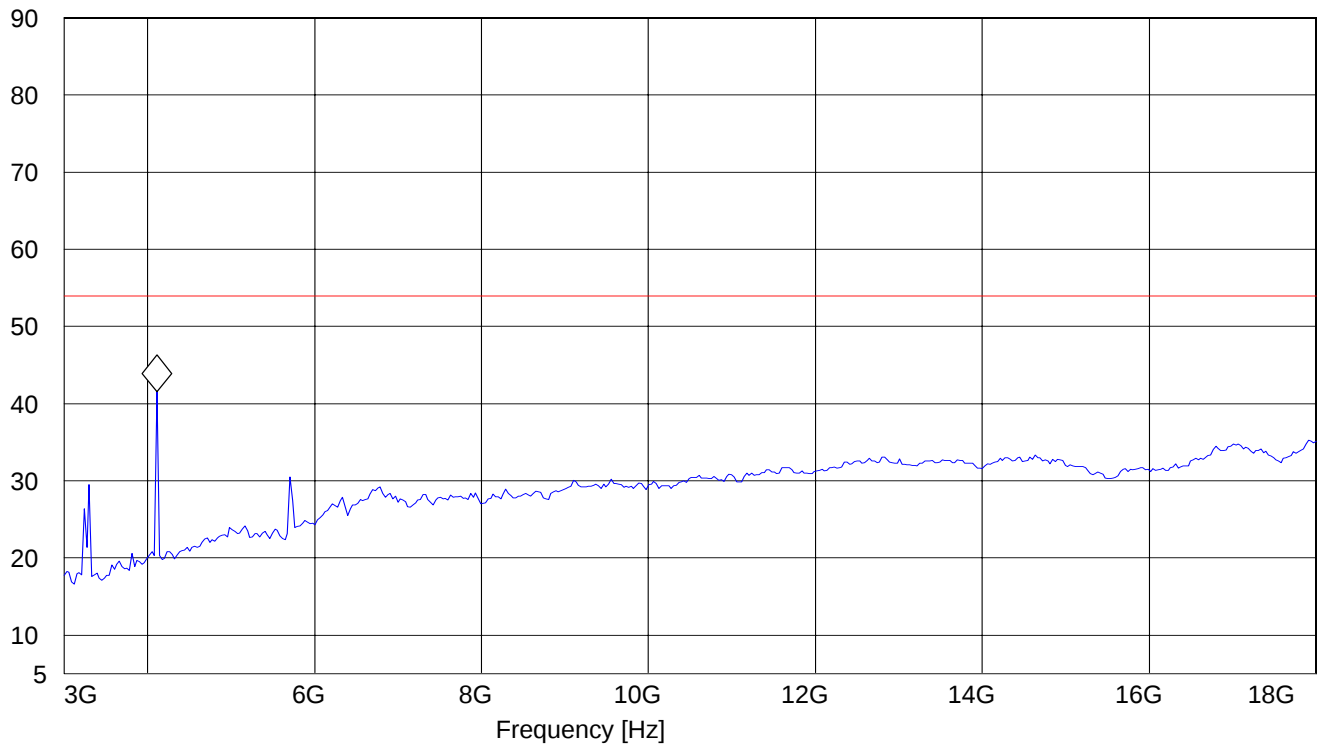
		"FCC Spuri hi 3-18G"				
Start	Stop	Detector	Meas.	RBW		Transducer
Frequency	Frequency	Time	Bandw.		VBW	
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	10Hz	#326 horn (dBi)

Marker:

4.112224449 GHz

41.59 dBμV/m

Level [dBμV/m]



EMISSION LIMITATIONS - Radiated (Transmitter)

§ 15.247 (c) (1)

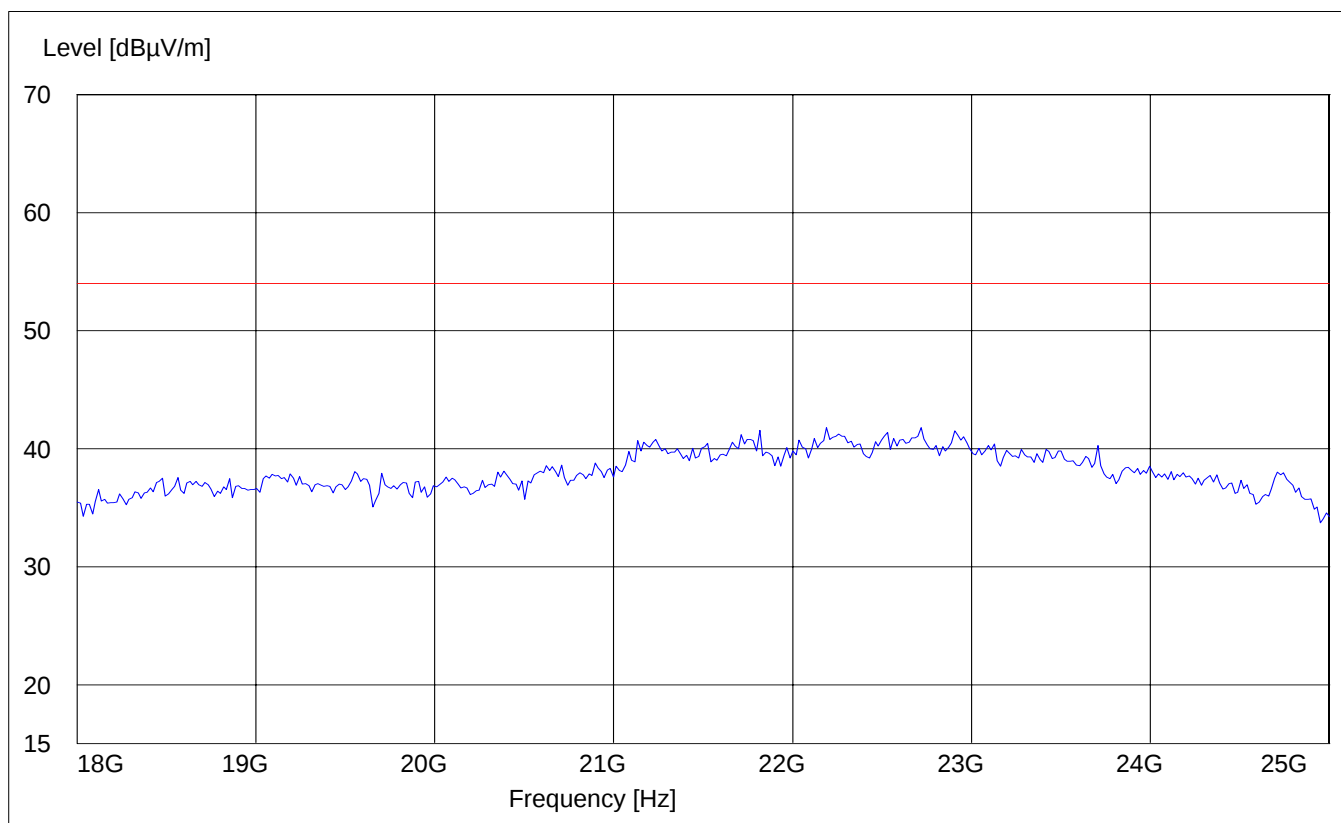
18GHz – 25GHz

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

SWEEP TABLE:

"FCC Spuri hi 18-25G"

Start	Stop	Detector	Meas.	RBW	Transducer
Frequency	Frequency	Time	Bandw.	VBW	
18 GHz	25 GHz	MaxPeak	Coupled	1 MHz	#326 horn (dBi)



TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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

BLOCK DIAGRAMS

Radiated Testing

ANECHOIC CHAMBER

