

**CETECOM Inc.**



**CETECOM Inc.**

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**Issued test report consists of 22 Pages**

**Page 1 (22)**

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<p><b>FCC LISTED, REG. NO.: 101450</b> <b>&amp;</b> <b>RECOGNIZED BY INDUSTRY CANADA</b> <b>IC – 3925</b></p>
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**Test report no.: EMC\_379\_FCC\_22\_2002**  
**FCC Part 22, RSS 133**  
**(FCC ID: HHV20021106)**

**Table of Contents**

<b>1</b>	<b>General information</b>
<b>1.1</b>	<b>Notes</b>
<b>1.2</b>	<b>Testing laboratory</b>
<b>1.3</b>	<b>Details of applicant</b>
<b>1.4</b>	<b>Application details</b>
<b>1.5</b>	<b>Test item</b>
<b>1.6</b>	<b>Test standards</b>
<b>2</b>	<b>Technical test</b>
<b>2.1</b>	<b>Summary of test results</b>
<b>2.2</b>	<b>Test report</b>
<b>1</b>	<b>General information</b>
<b>1.1</b>	<b>Notes</b>

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM Inc. 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.

**TEST REPORT PREPARED BY:****EMC Engineer: Pete Krebill****1.2 Testing laboratory**

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**1.3 Details of applicant**

<b>Name</b>	:	Matsushita Electric Works, Ltd.
<b>Street</b>	:	1048 Oaza Kadoma, Kadoma-shi
<b>City / Zip Code</b>	:	Osaka-fu 571-8686
<b>Country</b>	:	Japan
<b>Contact</b>	:	Iwao Oyaizu
<b>Telephone</b>	:	+81-59-228-9312
<b>Tele-fax</b>	:	+81-59-224-5926
<b>e-mail</b>	:	ioyaizu@tsu.mew.co.jp

**1.4 Application details**

Date of receipt of application	:	2002-11-18
Date of receipt test item	:	2002-11-18
Date of test	:	2002-12-02

**1.5 Test item**

Manufacturer	:	Matsushita Electric Works, Ltd. & Shintom co,Ltd.
Country	:	Japan
Model No.	:	ECG2111
Serial No.(ESN)	:	17408810927
Description	:	Emergency Portable Cellular Telephone
FCC-ID	:	HHV20021106

**Additional information**

Frequency	:	824MHz – 849MHz
Type of modulation	:	AMPS
Antenna	:	Integral
Power supply	:	Battery
Output power	:	600mWatts

**1.6 Test standards**

FCC Part 22 / RSS133 r1

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

**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:**

2002-12-27    EMC & Radio    Lothar Schmidt (Manager)

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

2002-12-18    EMC & Radio    Pete Krebill(EMC Engineer)

**Date****Section****Name****Signature**

## **2.2 Test report**

### **TEST REPORT**

**Test report no.: EMC\_379\_FCC\_22\_2002**

TEST REPORT REFERENCE

PARAMETER TO BE MEASURED	PARAGRAPH	PAGE
EFFECTIVE RADIATED POWER LIMITS	§22.913 .....	7
EMISSION LIMITS TRANSMITTER	§2.1053 / §22.917.....	10

**EFFECTIVE RADIATED POWER LIMITS****§22.913****EIRP / ERP Measurements**

Description: This is the test for the maximum radiated power from the EUT.

Rule Part 22.913(a) specifies that "The ERP of mobile transmitters must not exceed 7 Watts".

Method of Measurement:

1. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power ( $P_{in}$ ) is applied to the input of the dipole, and the power received ( $P_r$ ) at the chamber's probe antenna is recorded.
2. A "reference path loss" is established as  $P_{in} + 2.1 - P_r$ .
3. The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
4. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs is identified.
5. "Gated mode" power measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in FCC Rule 22.913. The "reference path loss" from Step 1 is added to this result.
7. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.1 dBi) and known input power ( $P_{in}$ ).

**E.R.P. Results:**

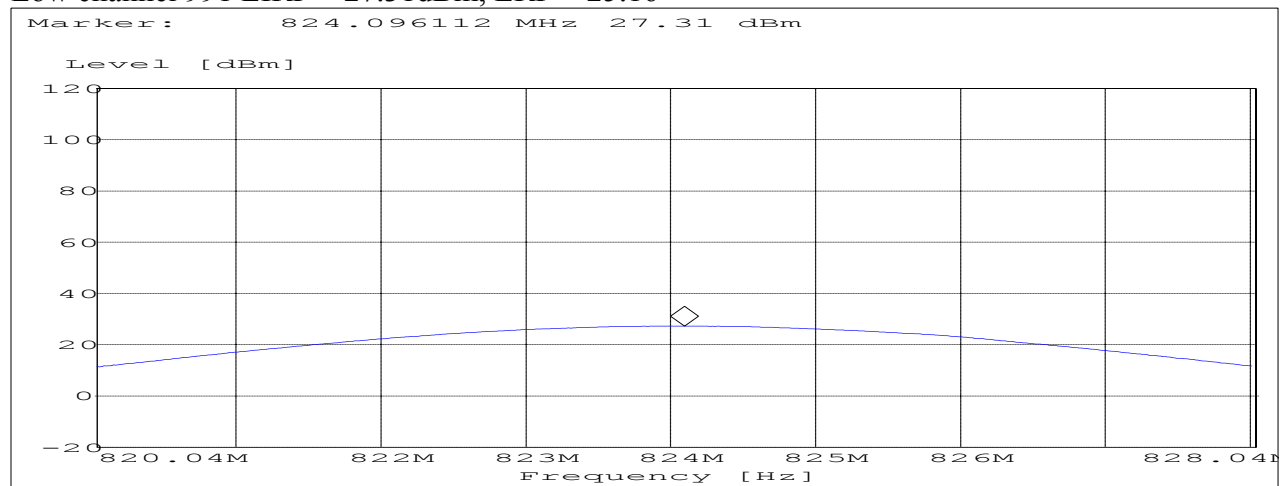
Channel 991 = 25.16 dBm

Channel 383 = 24.97 dBm

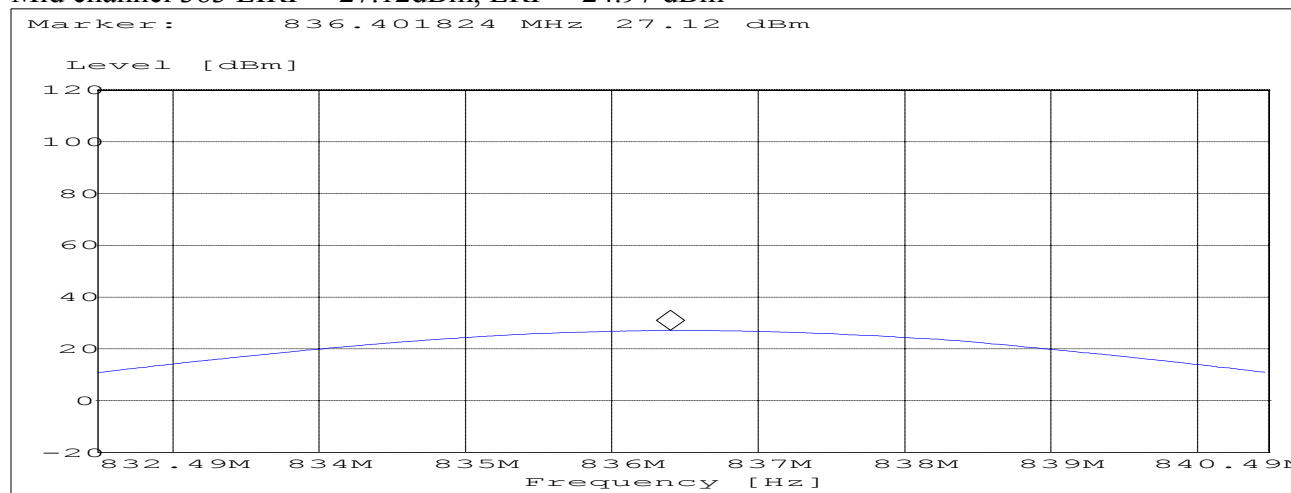
Channel 799 = 24.71 dBm

## RESULTS OF RADIATED TESTS:

Low channel 991 EIRP = 27.31dBm, ERP = 25.16

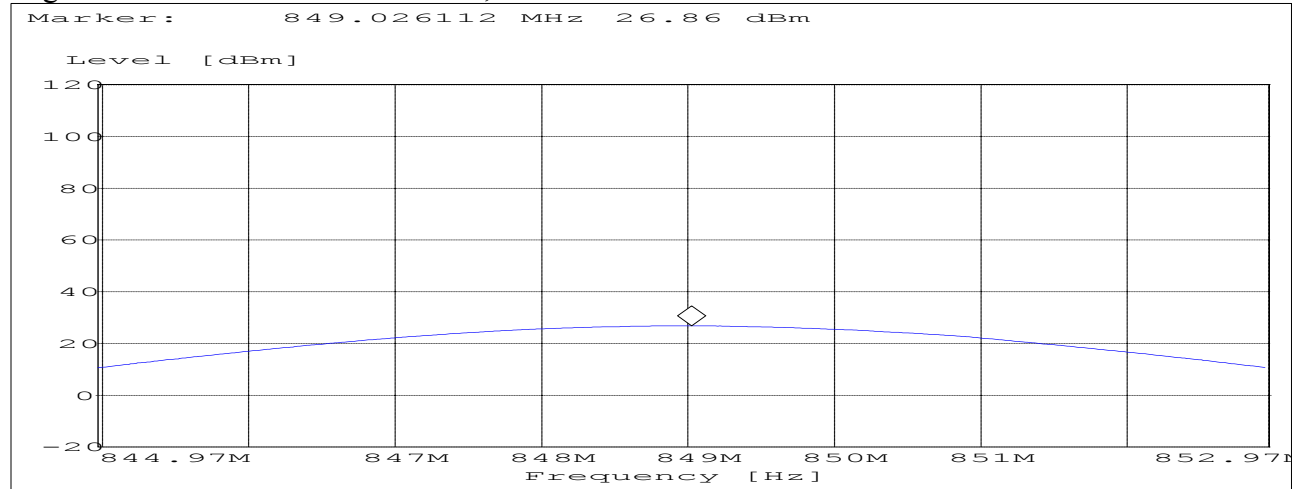


Mid channel 383 EIRP = 27.12dBm, ERP = 24.97 dBm





High channel 799 EIRP = 26.86dBm, ERP = 24.71 dBm



**EMISSION LIMITS TRANSMITTER****§2.1053 / §22.917****Measurement Procedure:**

The following steps outline the procedure used to measure the radiated emissions from the EUT. The site is constructed in accordance with ANSI C63.4 – 1992 requirements and is recognised by the FCC. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 22.917. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the AMPS band.

**The final Radiated emission test procedure is as follows:**

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) A double ridged waveguide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- c) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization. The maximum meter reading was recorded. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth. If the harmonic could not be detected above the noise floor, the ambient level was recorded. The equivalent power into a dipole antenna was determined by the substitution method described for ERP measurements.

**Measurement Limit:**

Sec. 22.917 Emission Limits.

- (a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

- (b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power

**Measurement Results:**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the AMPS band. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**RESULTS OF RADIATED TESTS:**

Harmonics	Tx ch-991 Freq. (MHz)	Level (dBm)	Tx ch-383 Freq. (MHz)	Level (dBm)	Tx ch-799 Freq. (MHz)	Level (dBm)
2	1648.08	-21.98	1672.98	-21.06	1697.94	-18.99
3	2472.12	-23.70	2509.47	-22.48	2546.91	-22.00
4	3296.16	-36.95	3345.96	-35.96	3395.88	-34.17
5	4120.2	-34.94	4182.45	-35.72	4244.85	-35.73
6	4944.24	-30.20	5018.94	-28.26	5093.82	-27.94
7	5768.28	-29.76	5855.43	-28.64	5942.79	-27.03
8	6592.32	-21.92	6691.92	-19.95	6791.76	-17.34
9	7416.36	-22.91	7528.41	-21.98	7640.73	-22.82
10	8240.4	-21.53	8364.9	-21.54	8489.7	-20.30

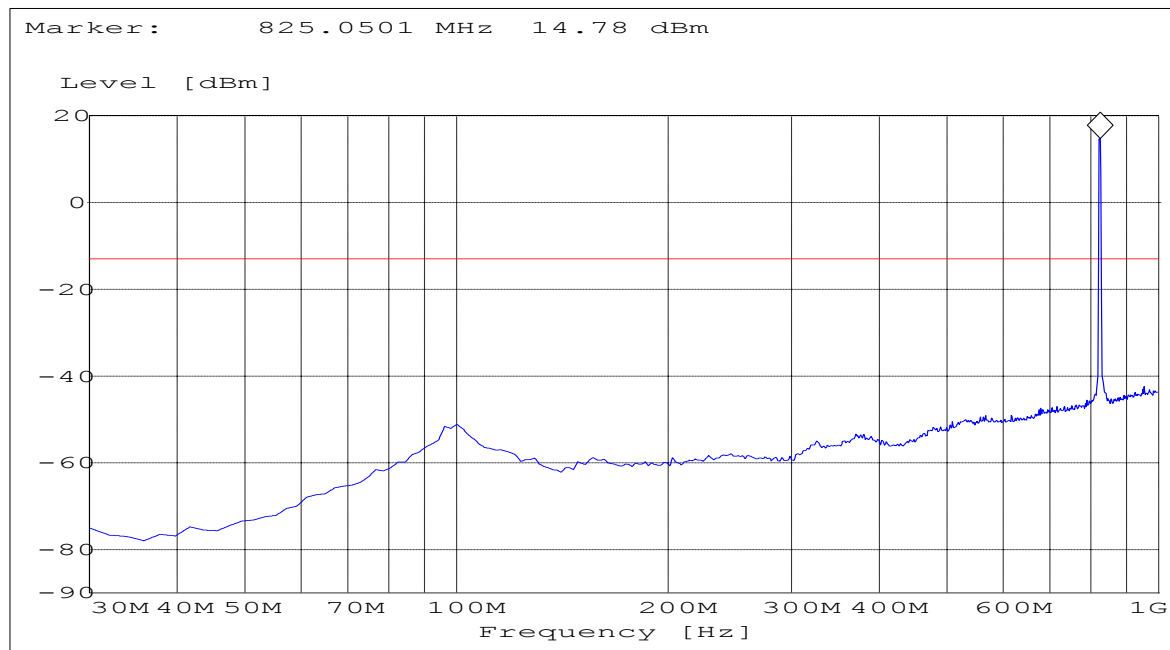
## RADIATED SPURIOUS EMISSIONS

### Channel 991: 30MHz - 1GHz

Spurious emission limit -13dBm

#### SWEEP TABLE: "FCC 22 Spur 30M-1G"

Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
30MHz	1GHz	Max Peak	Coupled	1MHz



Note: The peak above the limit line is the carrier freq. at ch-991.

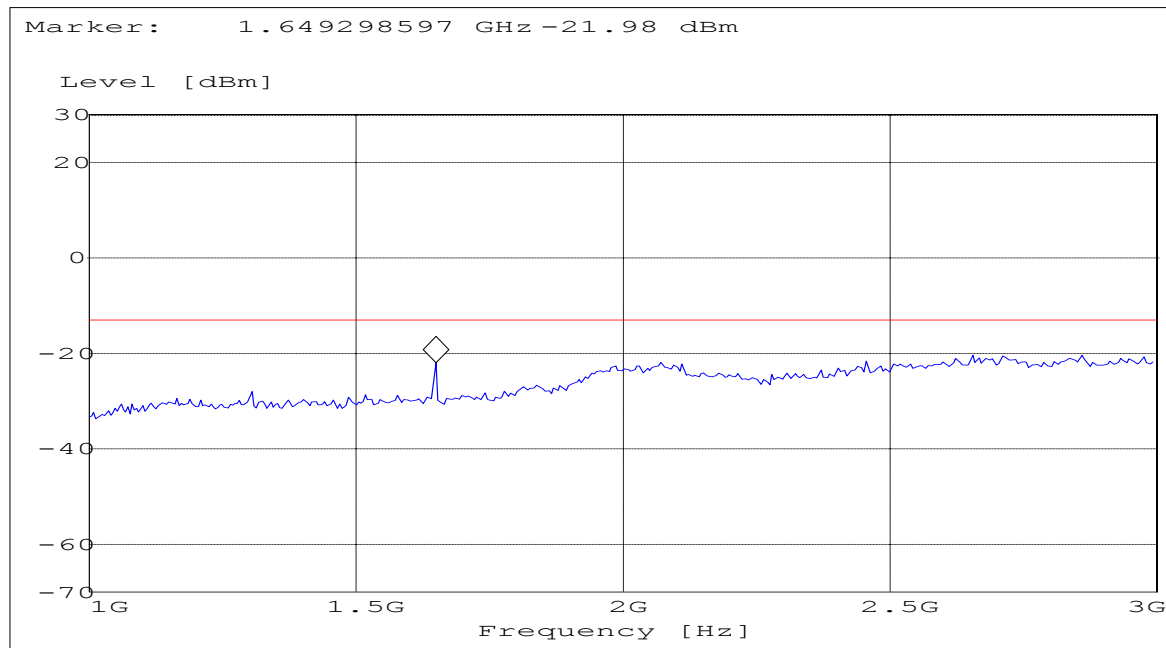
## RADIATED SPURIOUS EMISSIONS

### Channel 991: 1GHz – 3GHz

Spurious emission limit –13dBm

#### *SWEEP TABLE: "FCC 22 Spur 1-3G"*

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
1GHz	3GHz	Max Peak	Coupled	1 MHz



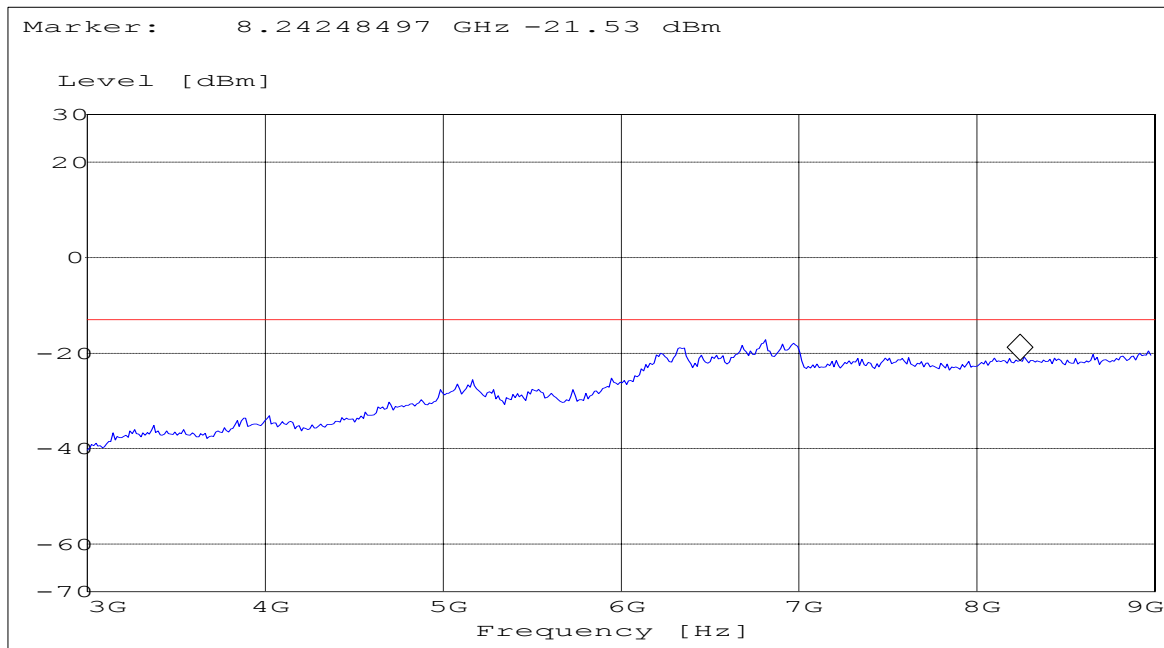
## RADIATED SPURIOUS EMISSIONS

### Channel 991: 3GHz – 9GHz

Spurious emission limit –13dBm

#### ***SWEEP TABLE: "FCC 22 Spur 3-9G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
3GHz	9GHz	Max Peak	Coupled	1 MHz

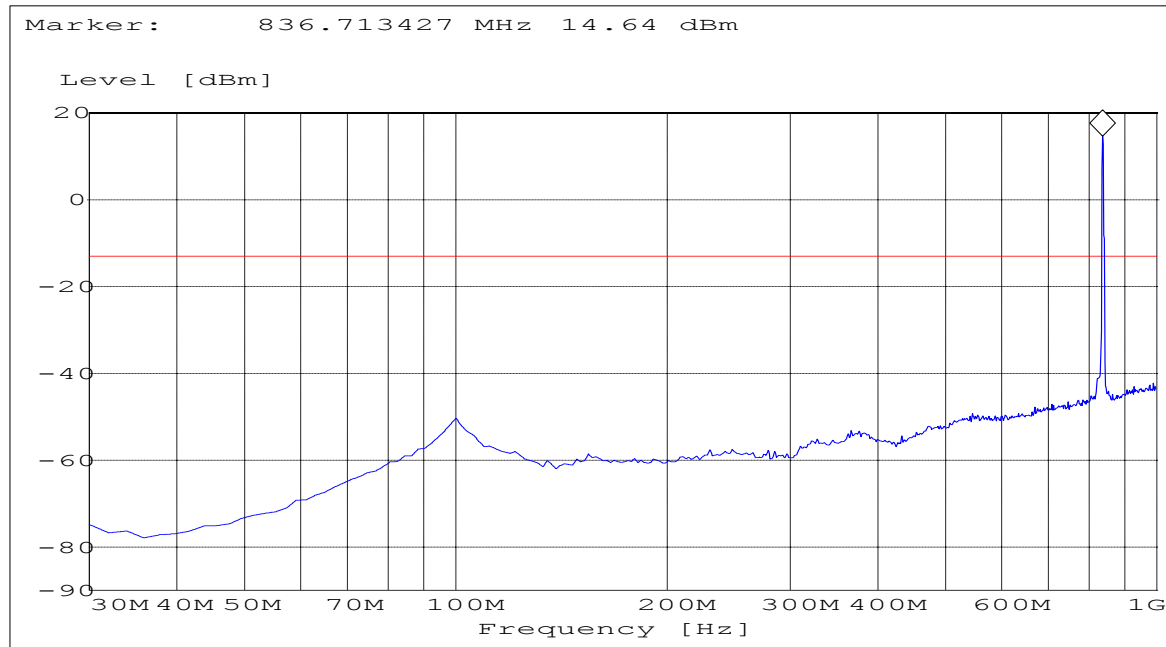


## Channel 383: 30MHz - 1GHz

Spurious emission limit -13dBm

### SWEEP TABLE: "FCC 22 Spur 30M-1G"

Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
30MHz	1GHz	Max Peak	Coupled	1MHz



Note: The peak above the limit line is the carrier freq. at ch-383.

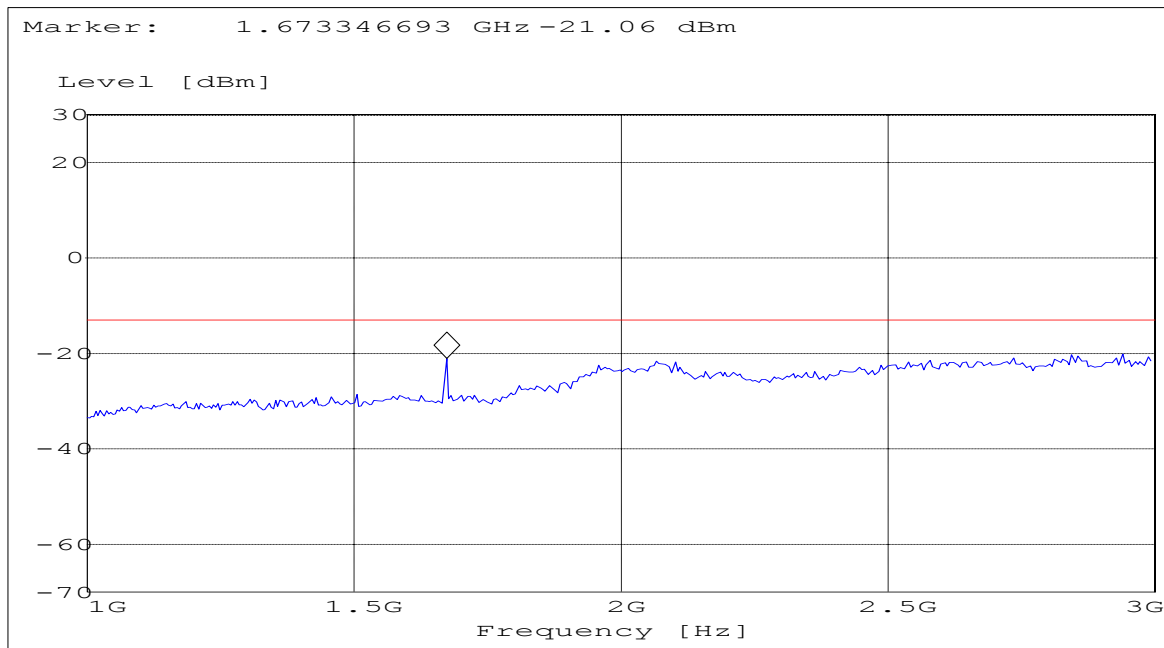
## RADIATED SPURIOUS EMISSIONS

### Channel 383: 1GHz – 3GHz

Spurious emission limit –13dBm

#### SWEEP TABLE: "FCC 22 Spur 1-3G"

Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
1GHz	3GHz	Max Peak	Coupled	1 MHz





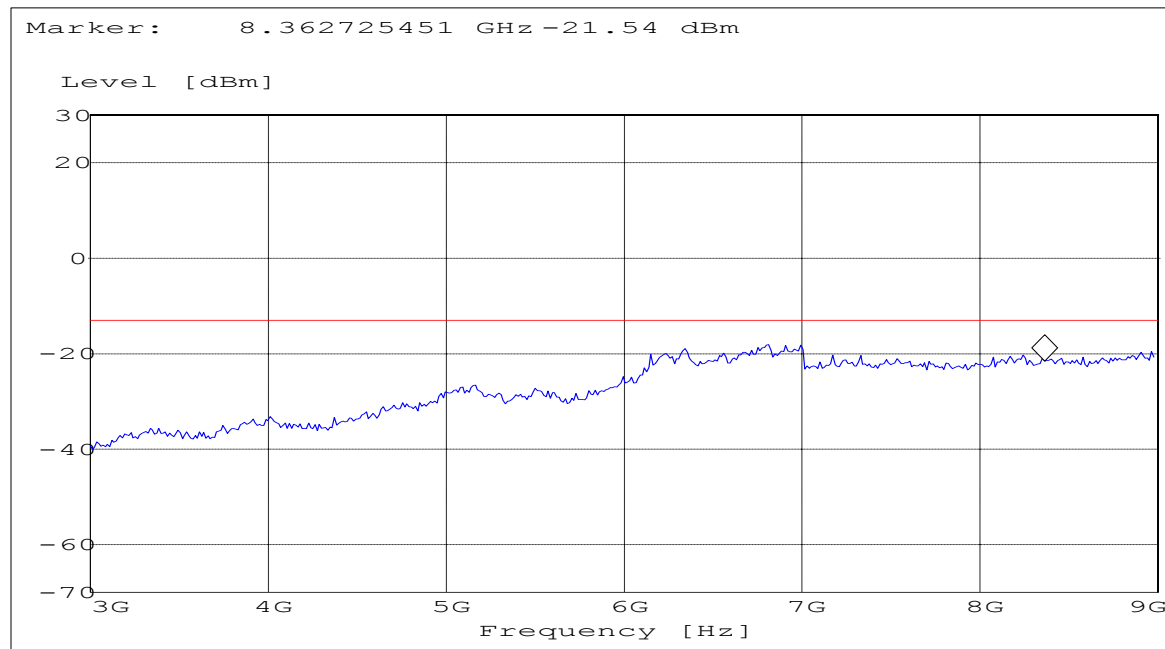
## RADIATED SPURIOUS EMISSIONS

### Channel 383: 3GHz – 9GHz

Spurious emission limit –13dBm

#### SWEEP TABLE: "FCC 22 Spur 3-9G"

Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
3GHz	9GHz	Max Peak	Coupled	1 MHz

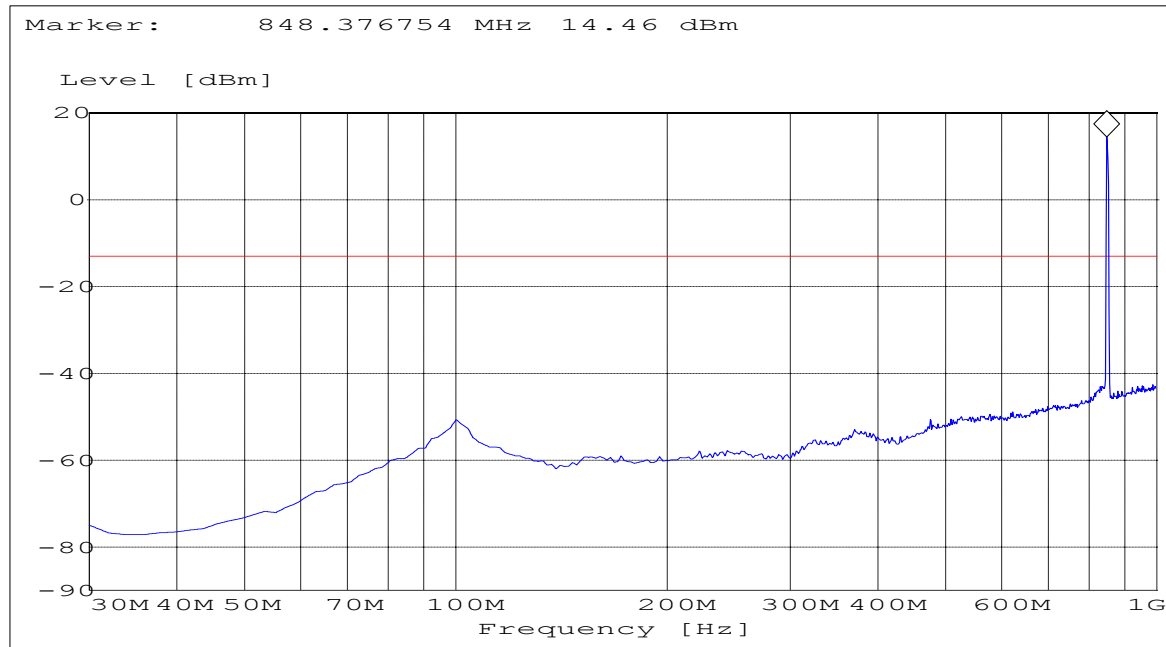


## Channel 799: 30MHz - 1GHz

Spurious emission limit -13dBm

### SWEEP TABLE: "FCC 22 Spur 30M-1G"

Start	Stop	Detector	Meas.	RBW/VBW
Frequency	Frequency		Time	
30MHz	1GHz	Max Peak	Coupled	1MHz



Note: The peak above the limit line is the carrier freq. at ch-799.

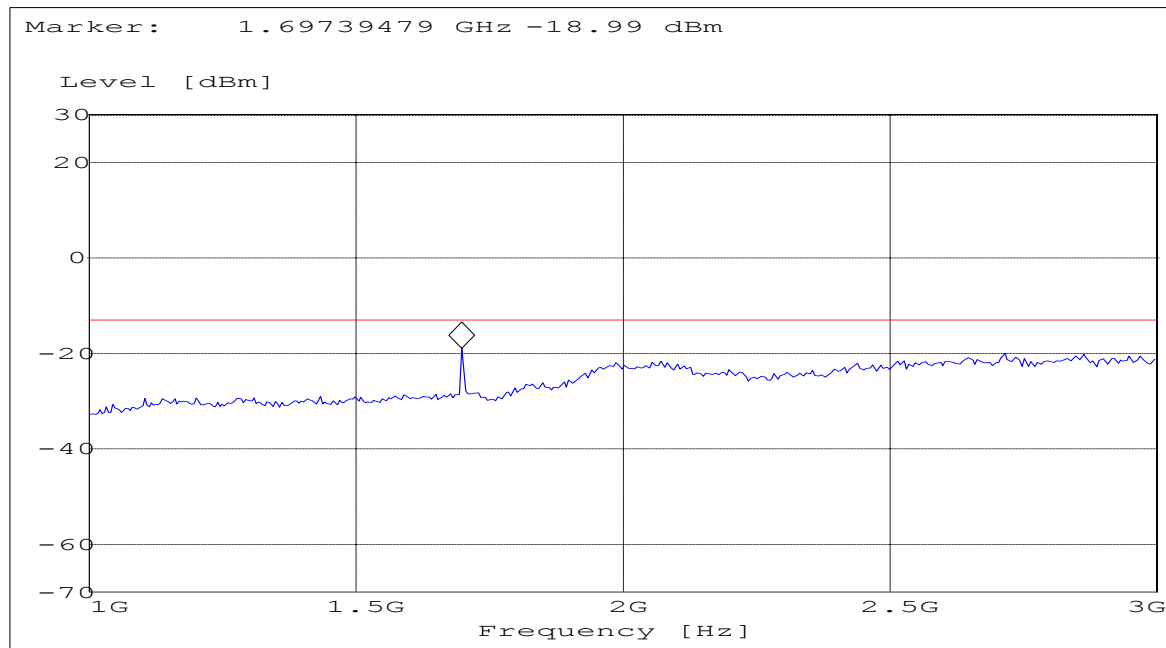
## RADIATED SPURIOUS EMISSIONS

### Channel 799: 1GHz – 3GHz

Spurious emission limit –13dBm

#### *SWEEP TABLE: "FCC 22 Spur 1-3G"*

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
1GHz	3GHz	Max Peak	Coupled	1 MHz



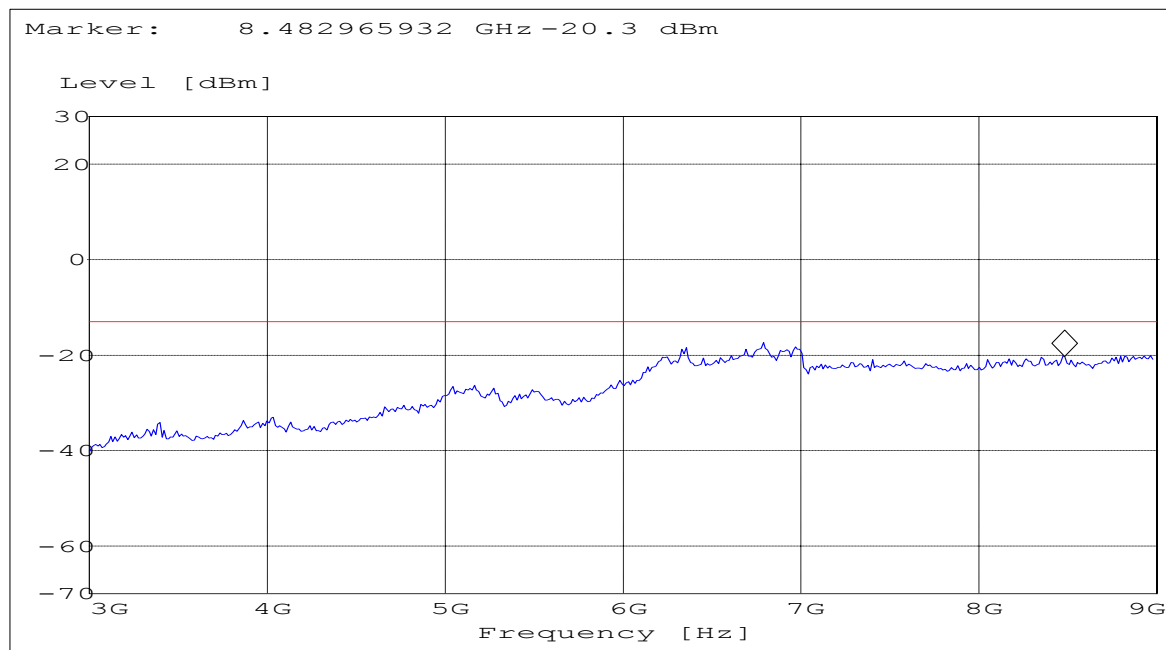
## RADIATED SPURIOUS EMISSIONS

**Channel 799: 3GHz – 9GHz**

Spurious emission limit –13dBm

### ***SWEEP TABLE: "FCC 22 Spur 3-9G"***

<i>Start</i>	<i>Stop</i>	<i>Detector</i>	<i>Meas.</i>	<i>RBW/VBW</i>
<i>Frequency</i>	<i>Frequency</i>		<i>Time</i>	
3GHz	9GHz	Max Peak	Coupled	1 MHz



**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	Signal Generator	SMY02	Rohde & Schwarz	836878/011
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02
05	Power Amplifier	250W1000	Amplifier Research	300031
06	Biconilog Antenna	3141	EMCO	0005-1186
07	Horn Antenna	SAS-200/571	AH Systems	325
08	Power Splitter	11667B	Hewlett Packard	645348
09	Climatic Chamber	VT4004	Votch	G1115
10	Pre-Amplifier	JS4-00102600	Miteq	00616
11	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807
12	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06

**Radiated Testing**

**ANECHOIC CHAMBER**

