



# FCC Test Report

Test report no.: EMC\_873FCC24\_2005\_G550

**FCC Part 24 / RSS 133  
Model: G550**

**FCC ID: PX2LPG550  
IC ID: 4194A-LPG550**



**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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<b>1</b>	<b>General information</b>
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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: Harpreet Sidhu****1.2 Testing laboratory**

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**1.3 Details of applicant**

**Name** : Wherify Wireless, Inc.  
**Street** : 2000 Bridge Parkway, Suite 201  
**City / Zip Code** : Redwood Shores, CA 94605  
**Country** : USA  
**Contact** : Jeff Hoever  
**Telephone** : 650 551 5242  
**Tele-fax** : 650 551 5225  
**e-mail** : [jhoever@wherify.com](mailto:jhoever@wherify.com)

**1.4 Application details**

Date of receipt test item : 2005-04-07  
Date of test : 2005-04-07/08

**1.5 Test item**

**Manufacturer** : Applicant  
**Marketing Name** : Wherifone G560  
**Model No.** : **G550**  
**Description** : [GSM 1900 phone](#)  
**FCC-ID** : **P2XLPG550**  
**IC-ID** : **4194A-LPG550**

**Additional information**

**Frequency** : 1850.2MHz – 1909.8MHz for PCS 1900  
**Type of modulation** : GMSK  
**Number of channels** : 299 for PCS-1900  
**Antenna** : External (Meandering Helical)  
**Power supply** : Battery / power adaptor  
**Output power** : 29.93dBm (984.01mW) max. EIRP measured in PCS-1900  
**Extreme temp. Tolerance** : Lower: -20°C Upper: +60°C

**1.6 Test standards**

FCC Part 24 / 133 r1

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

**PROJECT OVERVIEW:**

The EUT (Wherifone G550) carries pre-certified Siemens GSM module model# XT55 with FCC ID: QIPXT55.

This test report covers full radiated testing as per FCC 24 on EUT with GSM module. All conducted measurements for are covered under *test report# GSM\_cond\_test\_rpt\_XT55*



## **2.2 Test report**

**TEST REPORT**

**Test report no.: EMC\_873FCC24\_2005\_G550**

**TEST REPORT REFERENCE**

<b>PARAMETER TO BE MEASURED</b>	<b>PARAGRAPH</b>	<b>PAGE</b>
<b>POWER OUTPUT</b>	<b>§ 22.913(A) / § 24.232 (B)</b>	<b>8</b>
<b>EIRP (PCS-1900)</b>	<b>§24.232(b)</b>	<b>9</b>
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**POWER OUTPUT**

§ 22.913(a) / § 24.232 (b)

**Summary:**

During the process of testing, the EUT was controlled via Rhode & Schwarz Universal Radio Communication tester (CMU 200) to ensure max. Power transmission and proper modulation.

This paragraph contains peak output power & EIRP measurements for the EUT.  
In all cases, the peak output power is within the specified limits.

**Method of Measurements:**

The EUT was set up for the max. Output power with pseudo random data modulation.

The power was measured with R&S Spectrum Analyzer ESIB 40 (peak)

These measurements were done at 3 frequencies,

1850.2 MHz, 1880.0 MHz and 1909.8 MHz (bottom, middle and top of operational frequency range) for PCS-1900



**EIRP (PCS-1900) §24.232(b)****Limits:**

Power Control Level	Burst Peak EIRP
0	≤33dBm (1W)

**EIRP**

Frequency (MHz)	Power Control Level	Burst Peak (dBm)
		EIRP
1850.2	0	27.16
1880.0	0	29.06
1909.8	0	29.93
Measurement uncertainty		±0.5 dB

ANALYZER SETTINGS: RBW = VBW = 3MHz

**Note:** EIRP measurements were done in Antenna pattern measurement lab, therefore no plots are available for these measurements.

**EMISSION LIMITS TRANSMITTER****§2.1051 / §24.238****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 – 2003 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, which is the transmitted carrier that can be as high as 1910 MHz for PCS-1900. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the PCS-1900 bands.

**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) The antenna output was terminated in a 50-ohm load.
- c) A double-ridged wave guide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) 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. 24.238 Emission Limits.

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43 + 10 \log(P)$  dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

**Measurement Results:**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS-1900 bands. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS-1900 band into any of the other blocks respectively. 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 PCS-1900:**

<b>Harmonic</b>	<b>Tx ch-512 Freq.(MHz)</b>	<b>Level (dBm)</b>	<b>Tx ch-661 Freq. (MHz)</b>	<b>Level (dBm)</b>	<b>Tx ch-810 Freq. (MHz)</b>	<b>Level (dBm)</b>
<b>2</b>	<b>3700.4</b>	<b>-38.37</b>	<b>3760</b>	<b>-36.30</b>	<b>3819.6</b>	<b>-34.39</b>
<b>3</b>	<b>5550.6</b>	<b>-31.44</b>	<b>5640</b>	<b>-37.39</b>	<b>5729.4</b>	<b>-35.70</b>
<b>4</b>	<b>7400.8</b>	<b>-36.46</b>	<b>7520</b>	<b>-34.94</b>	<b>7639.2</b>	<b>-30.26</b>
<b>5</b>	<b>9251</b>	<b>-40.56</b>	<b>9400</b>	<b>-36.63</b>	<b>9549</b>	<b>-35.82</b>
<b>6</b>	<b>11101.2</b>	<b>NF</b>	<b>11280</b>	<b>-41.34</b>	<b>11458.8</b>	<b>NF</b>
<b>7</b>	<b>12951.4</b>	<b>NF</b>	<b>13160</b>	<b>NF</b>	<b>13368.6</b>	<b>NF</b>
<b>8</b>	<b>14801.6</b>	<b>NF</b>	<b>15040</b>	<b>NF</b>	<b>15278.4</b>	<b>NF</b>
<b>9</b>	<b>16651.8</b>	<b>NF</b>	<b>16920</b>	<b>NF</b>	<b>17188.2</b>	<b>NF</b>
<b>10</b>	<b>18502</b>	<b>NF</b>	<b>18800</b>	<b>NF</b>	<b>19098</b>	<b>NF</b>
<b>NF = NOISE FLOOR</b>						

**RADIATED SPURIOUS EMISSIONS**

**30MHz - 1GHz**

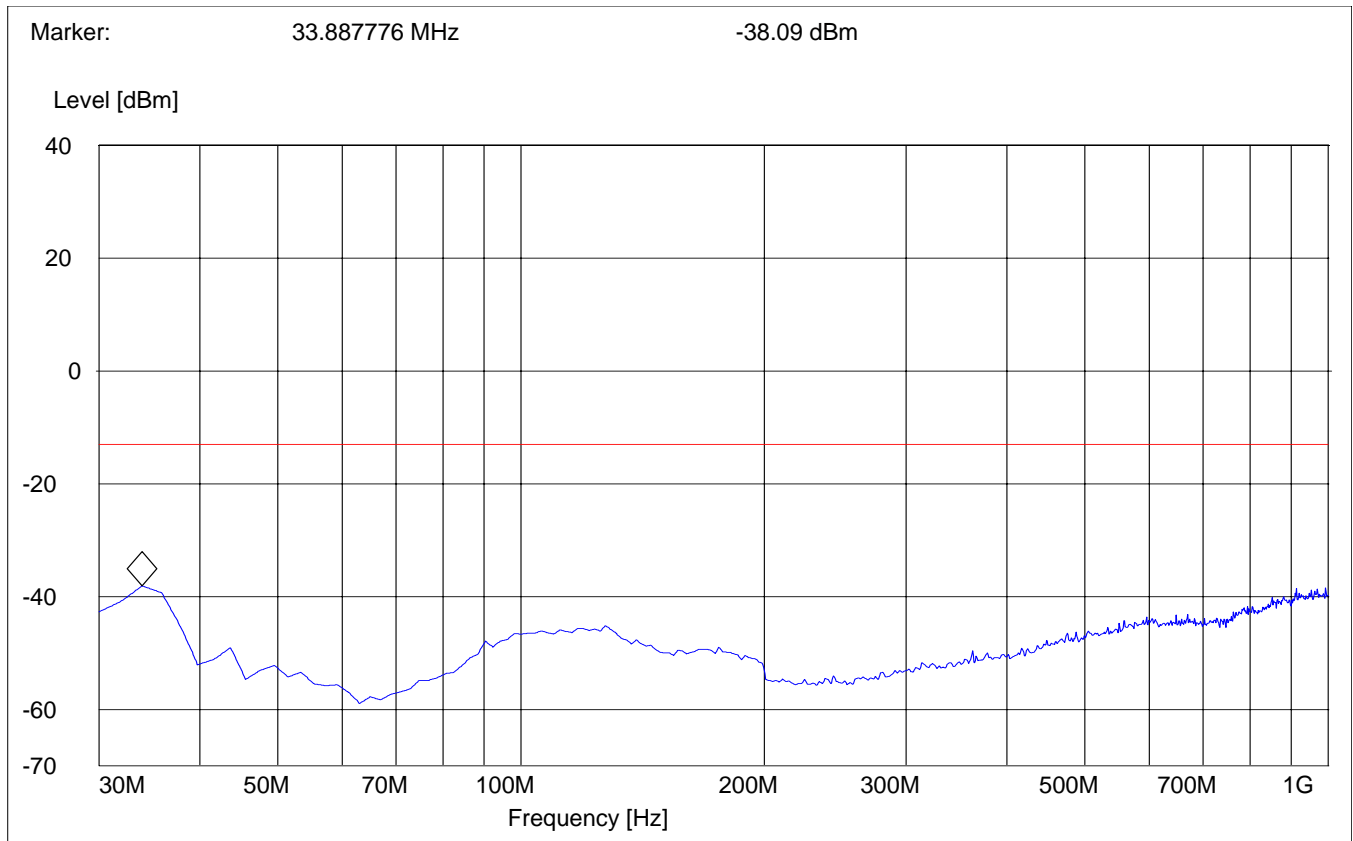
Spurious emission limit -13dBm

**Antenna: vertical**

*SWEEP TABLE: "FCC 24 Spur 30M-1G"*

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

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



**RADIATED SPURIOUS EMISSIONS**

**30MHz - 1GHz**

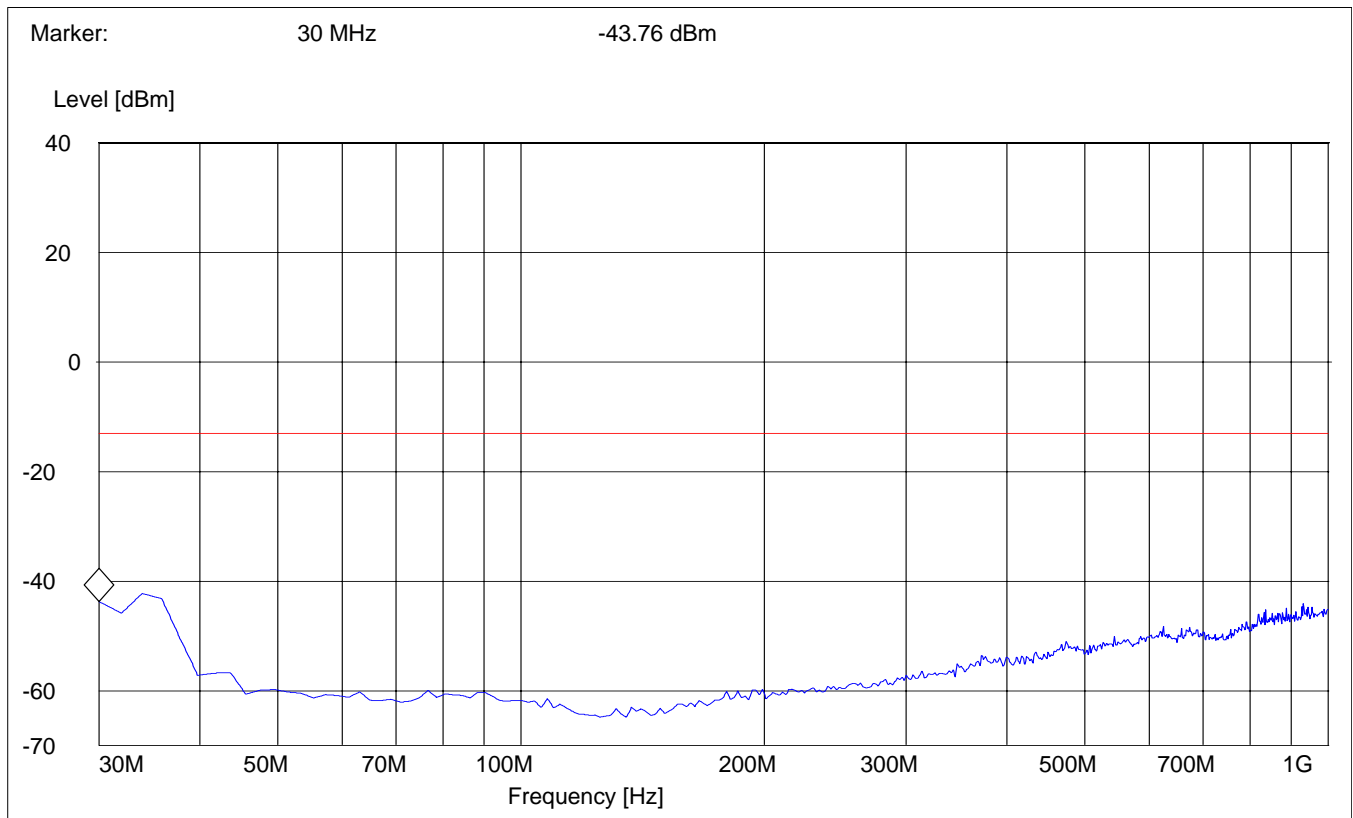
Spurious emission limit -13dBm

**Antenna: horizontal**

*SWEEP TABLE: "FCC 24 Spur 30M-1G"*

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

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



**RADIATED SPURIOUS EMISSIONS**

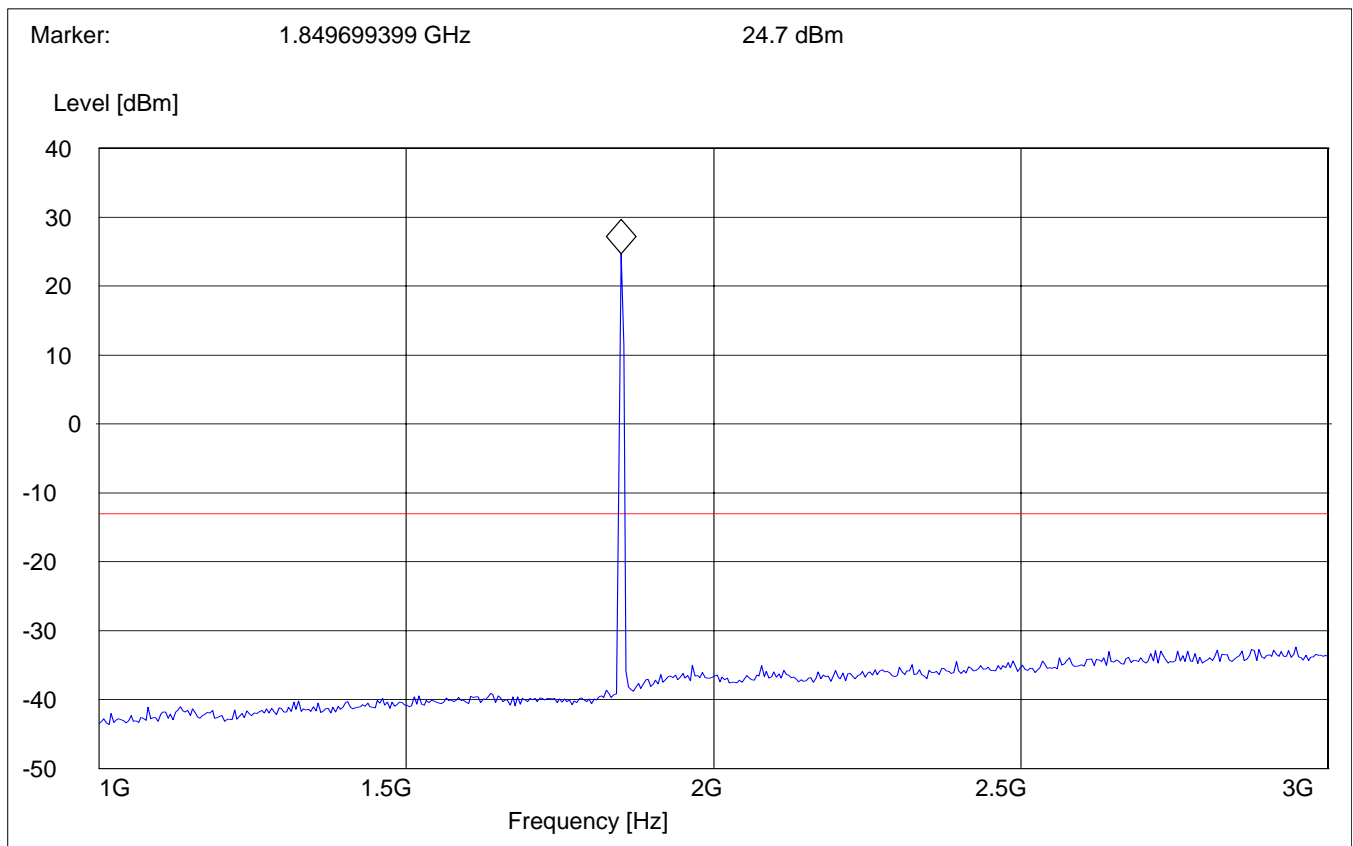
**Tx @ 1850.2MHz: 1GHz – 3GHz**

Spurious emission limit -13dBm

*SWEEP TABLE: "FCC Spuri 1-3G"*

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

**Note: The peak above the limit line is the carrier freq. at ch-512.**



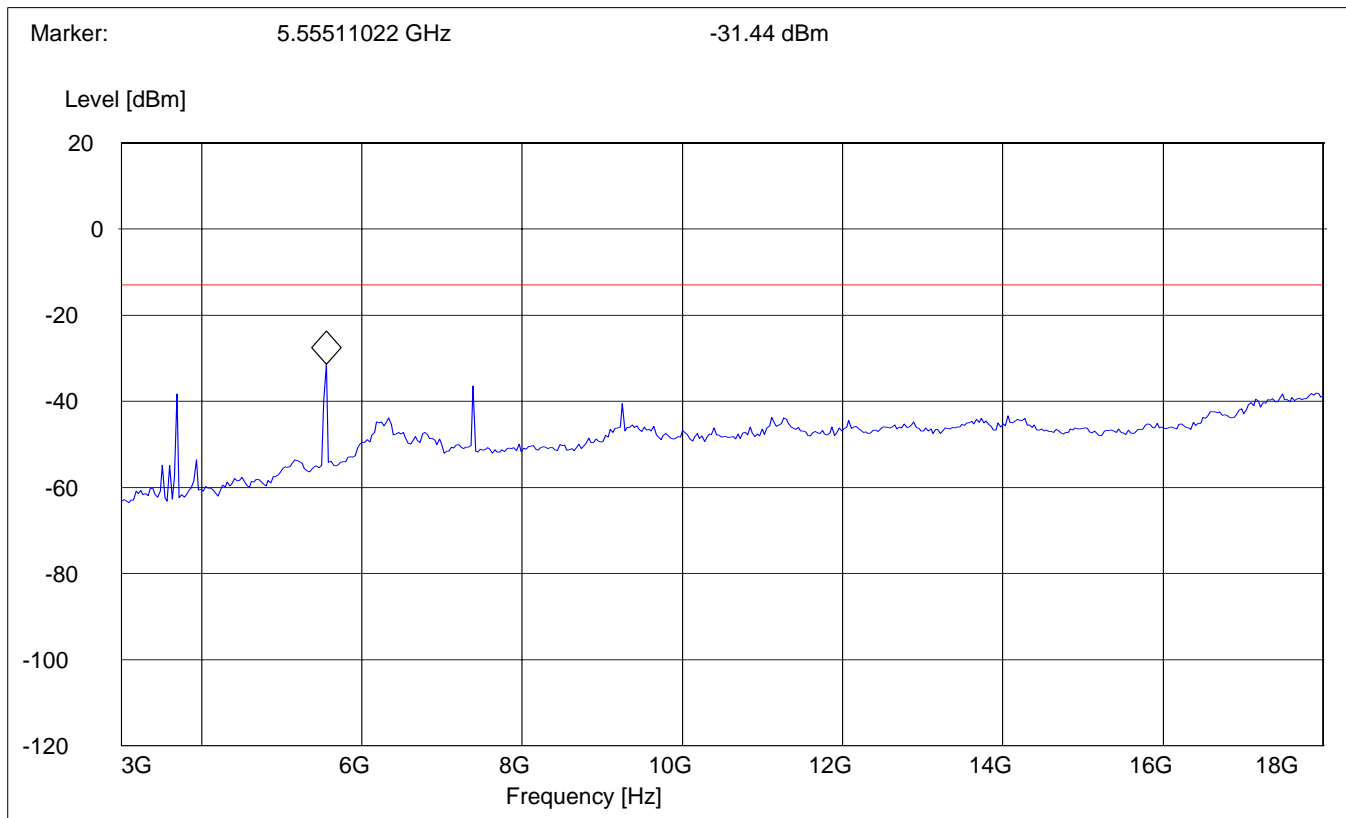
**RADIATED SPURIOUS EMISSIONS**

**Tx @ 1850.2MHz: 3GHz – 18GHz**

Spurious emission limit -13dBm

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

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz



**RADIATED SPURIOUS EMISSIONS**

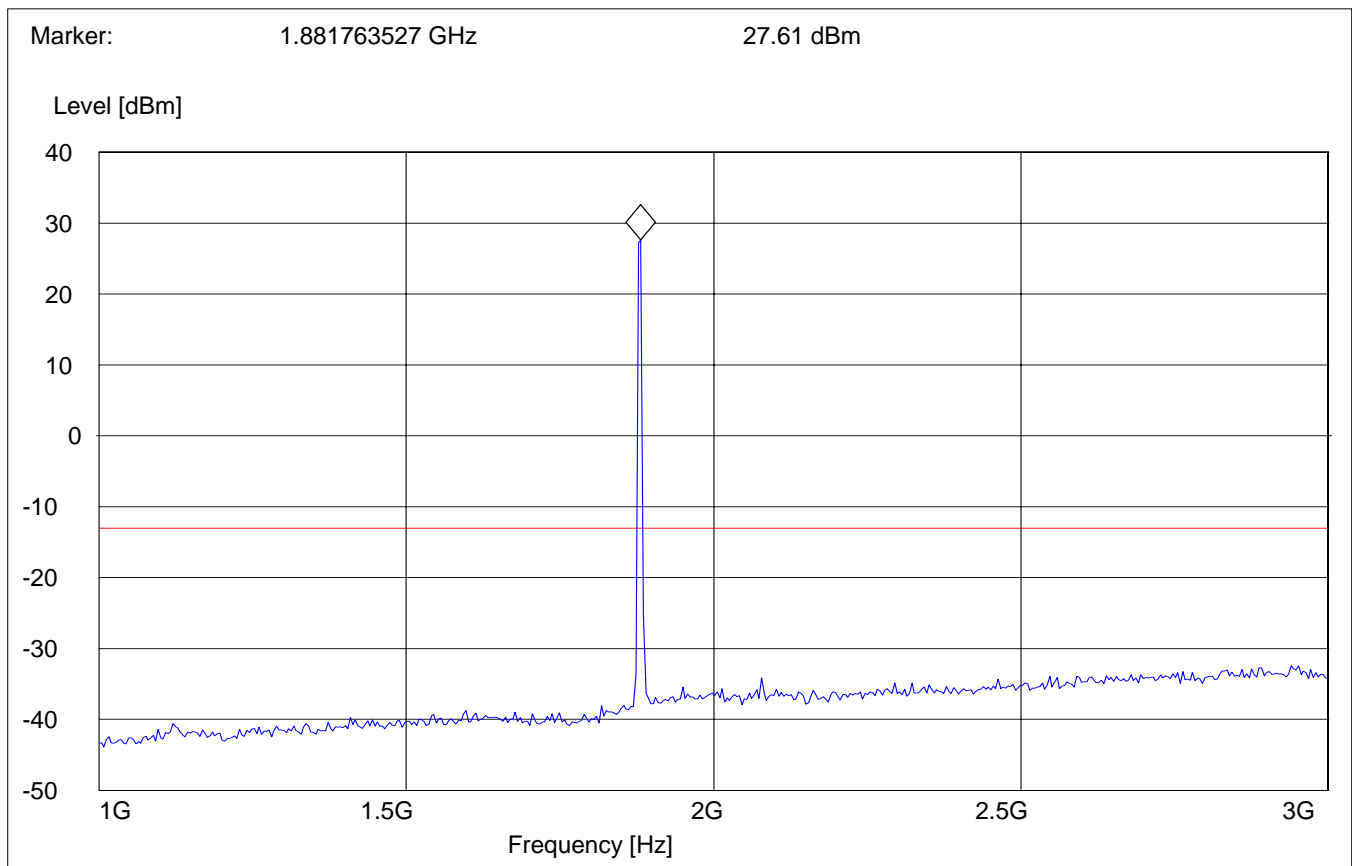
**Tx @ 1880.0MHz: 1GHz – 3GHz**

Spurious emission limit -13dBm

*SWEEP TABLE: "FCC Spuri 1-3G"*

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

**Note: The peak above the limit line is the carrier freq. at ch-661.**





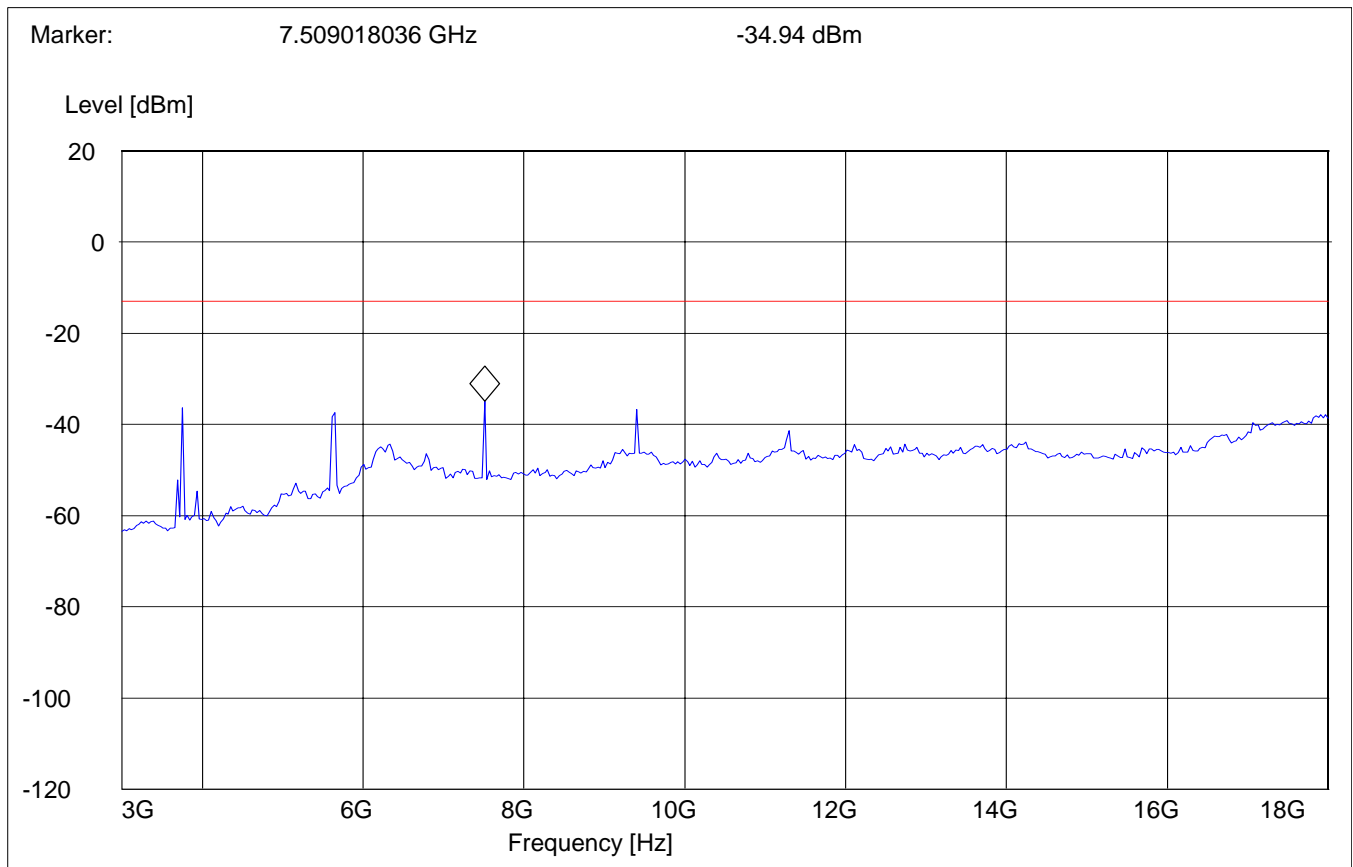
**RADIATED SPURIOUS EMISSIONS**

**Tx @ 1880.0MHz: 3GHz – 18GHz**

Spurious emission limit -13dBm

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

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz



**RADIATED SPURIOUS EMISSIONS**

**Tx @ 1909.8MHz: 1GHz – 3GHz**

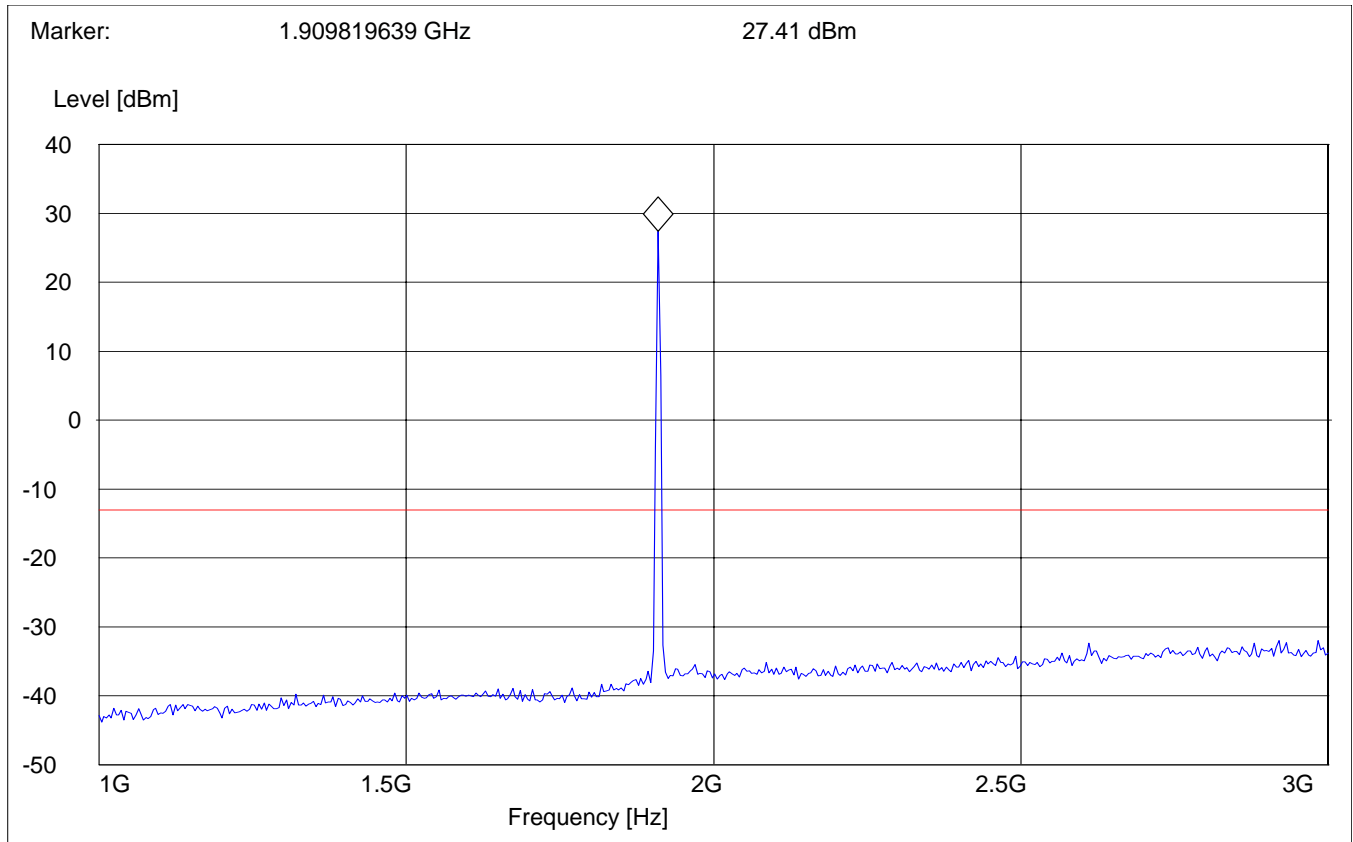
Spurious emission limit –13dBm

**SWEEP TABLE: "FCC Spuri 1-3G"**

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

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

**Note: The peak above the limit line is the carrier freq. at ch-810.**



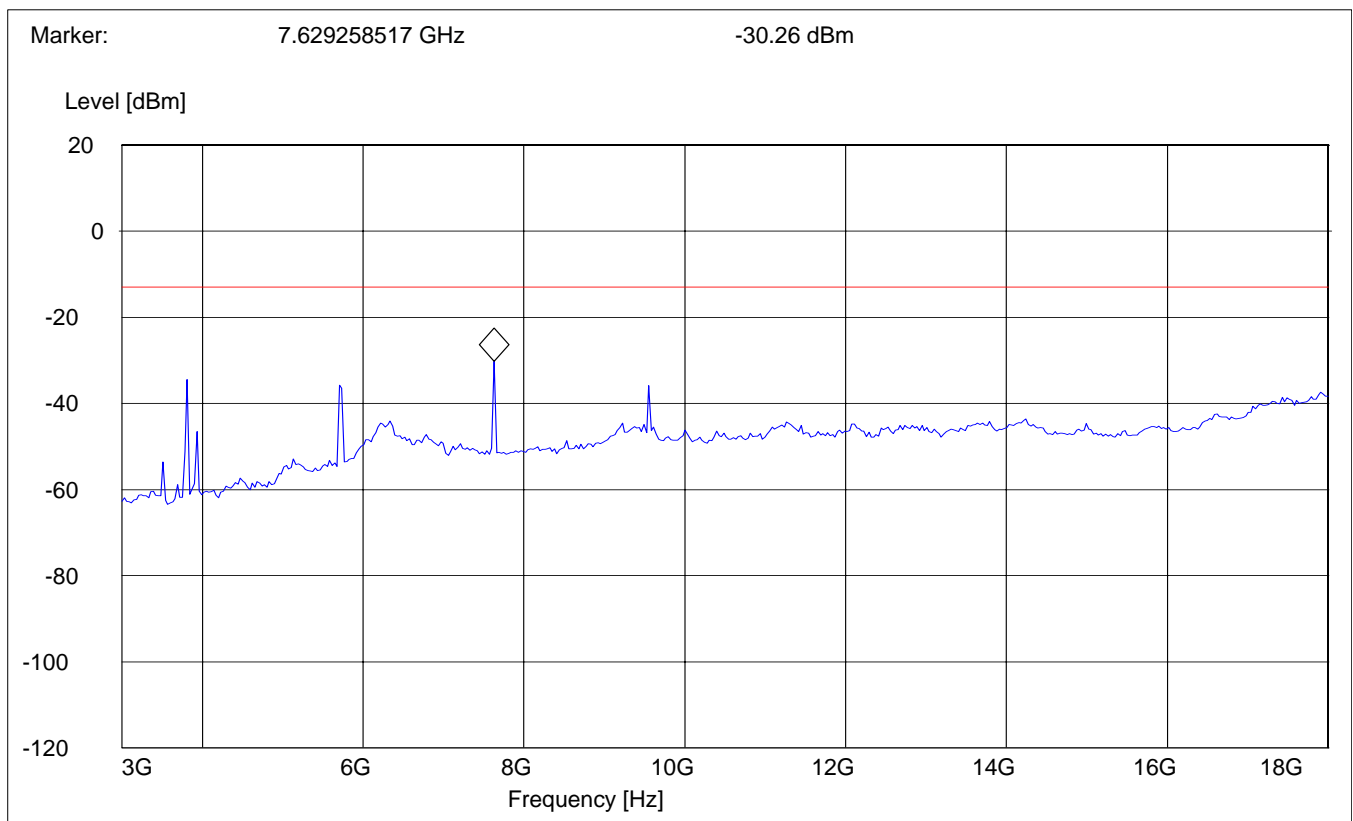
**RADIATED SPURIOUS EMISSIONS**

**Tx @ 1909.8MHz: 3GHz – 18GHz**

Spurious emission limit -13dBm

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

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz



### RADIATED SPURIOUS EMISSIONS

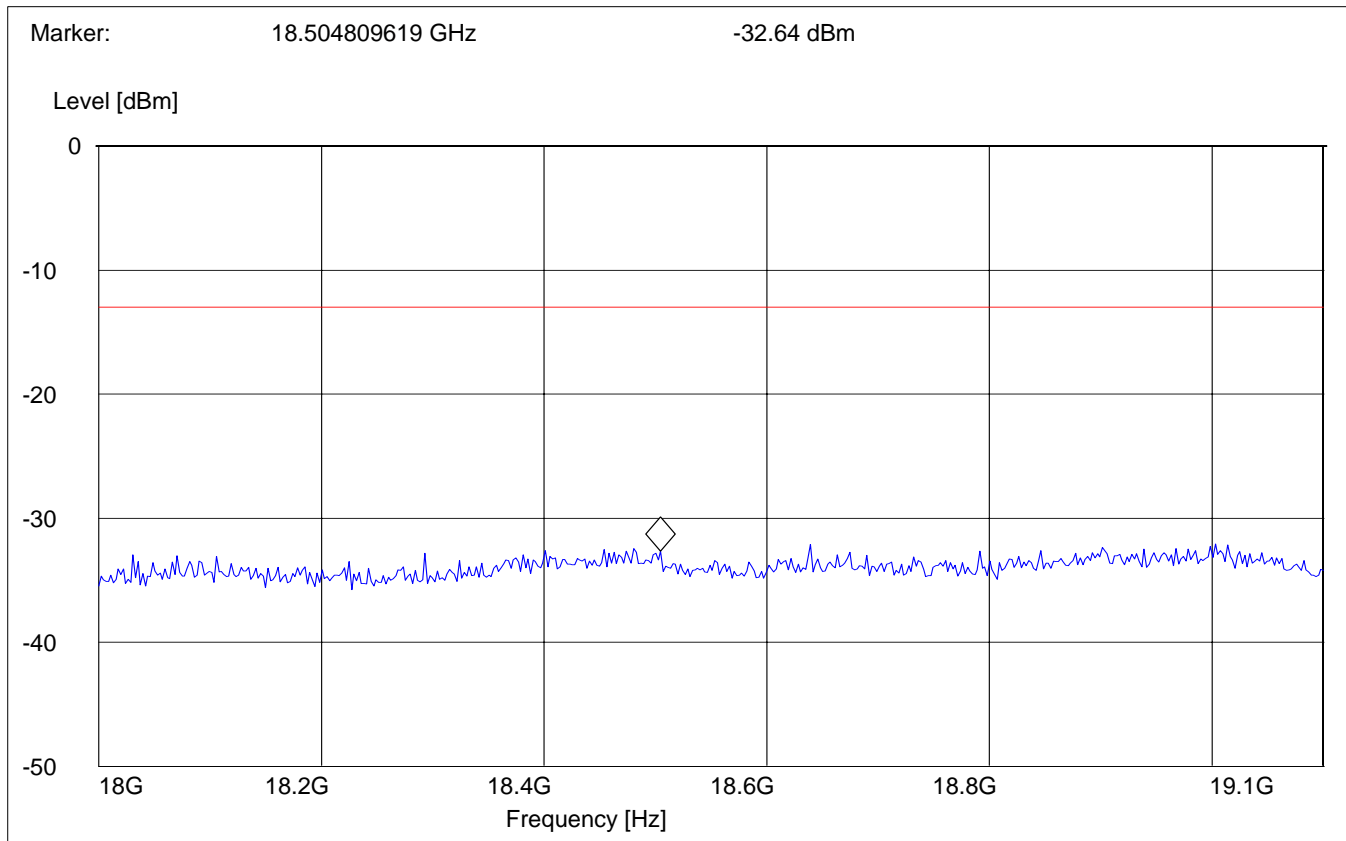
#### 18GHz – 19.1GHz

Spurious emission limit -13dBm

*SWEEP TABLE: "FCC 24 spuri 18-19.1G"*

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	19.1GHz	Max Peak	Coupled	1 MHz	1 MHz

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



**RADIATED SPURIOUS EMISSIONS (IDLE MODE)**

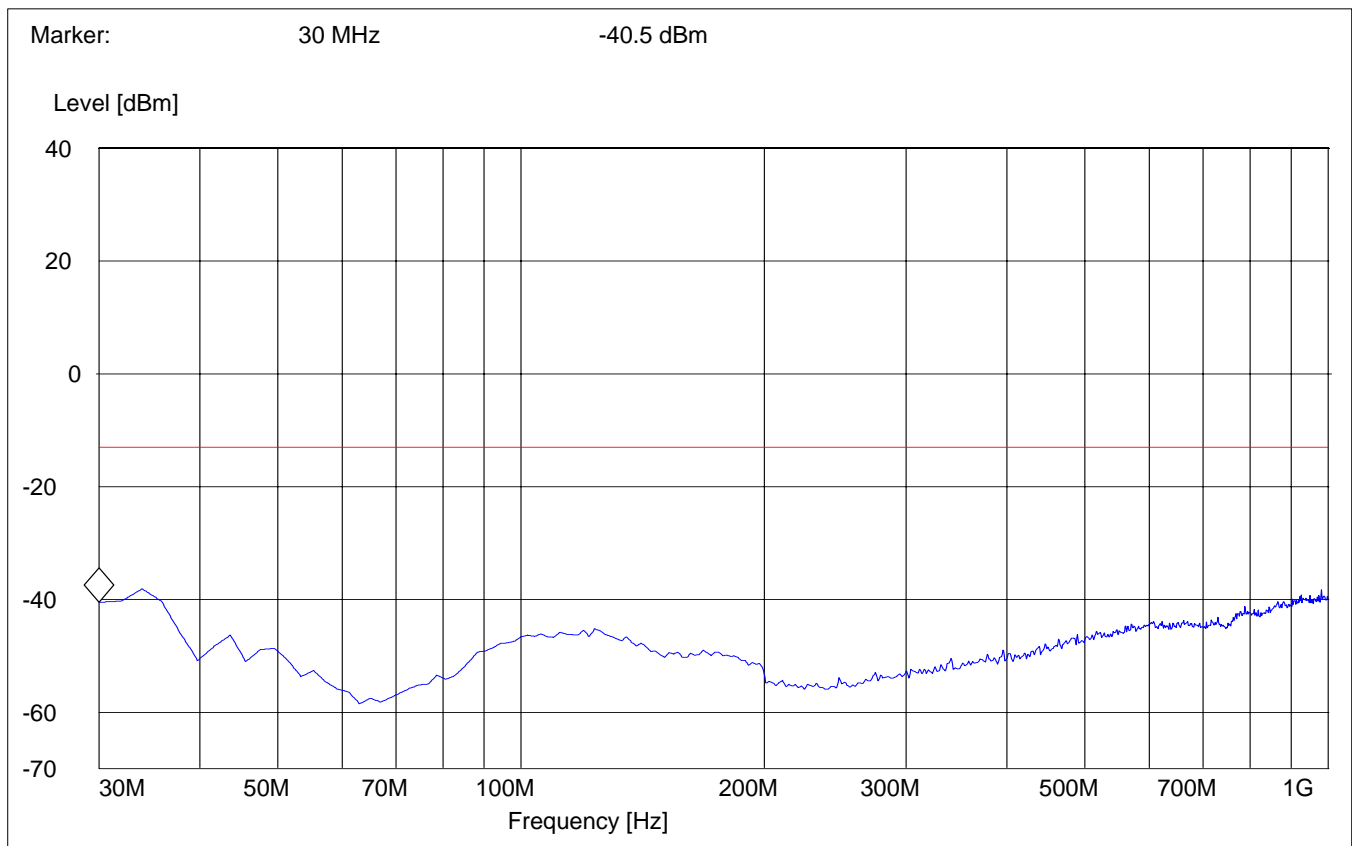
**EUT in Idle Mode: 30MHz – 1GHz**

Spurious emission limit -13dBm

**Antenna: vertical**

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

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



**RADIATED SPURIOUS EMISSIONS (IDLE MODE)**

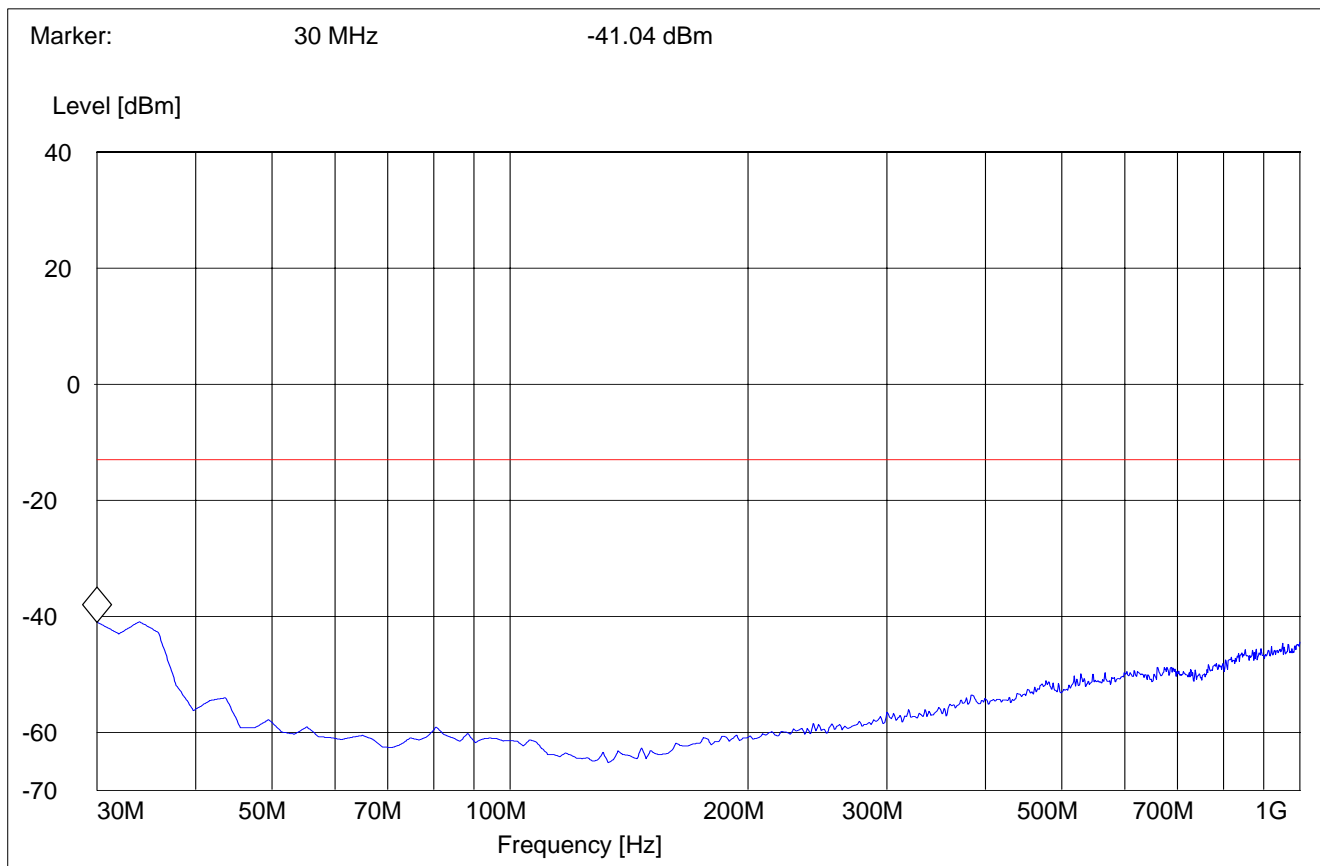
**EUT in Idle Mode: 30MHz – 1GHz**

Spurious emission limit -13dBm

**Antenna: horizontal**

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

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



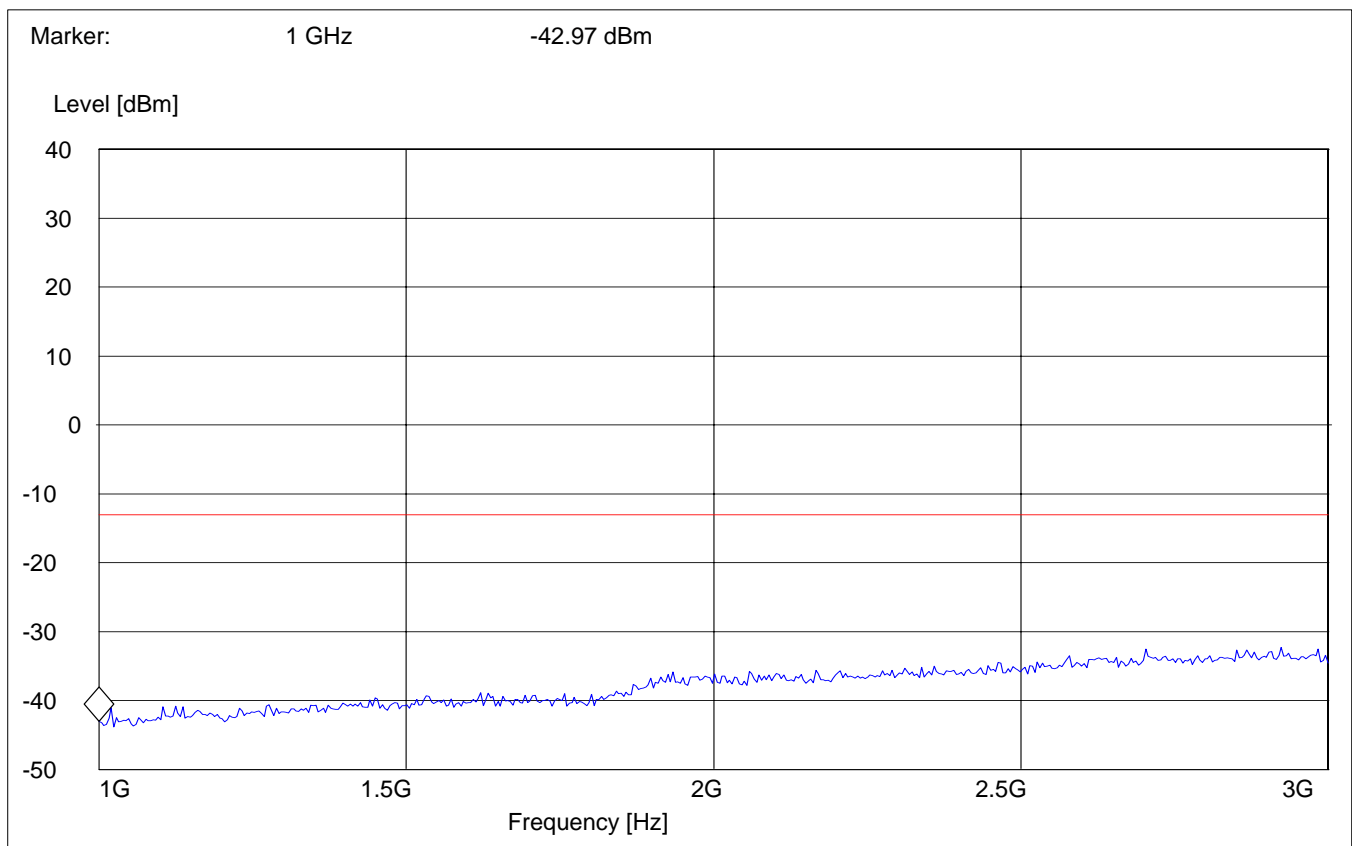
**RADIATED SPURIOUS EMISSIONS (IDLE MODE)**

**EUT in Idle Mode: 1GHz – 3GHz**

Spurious emission limit -13dBm

**SWEEP TABLE: "FCC Spuri 1-3G"**

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



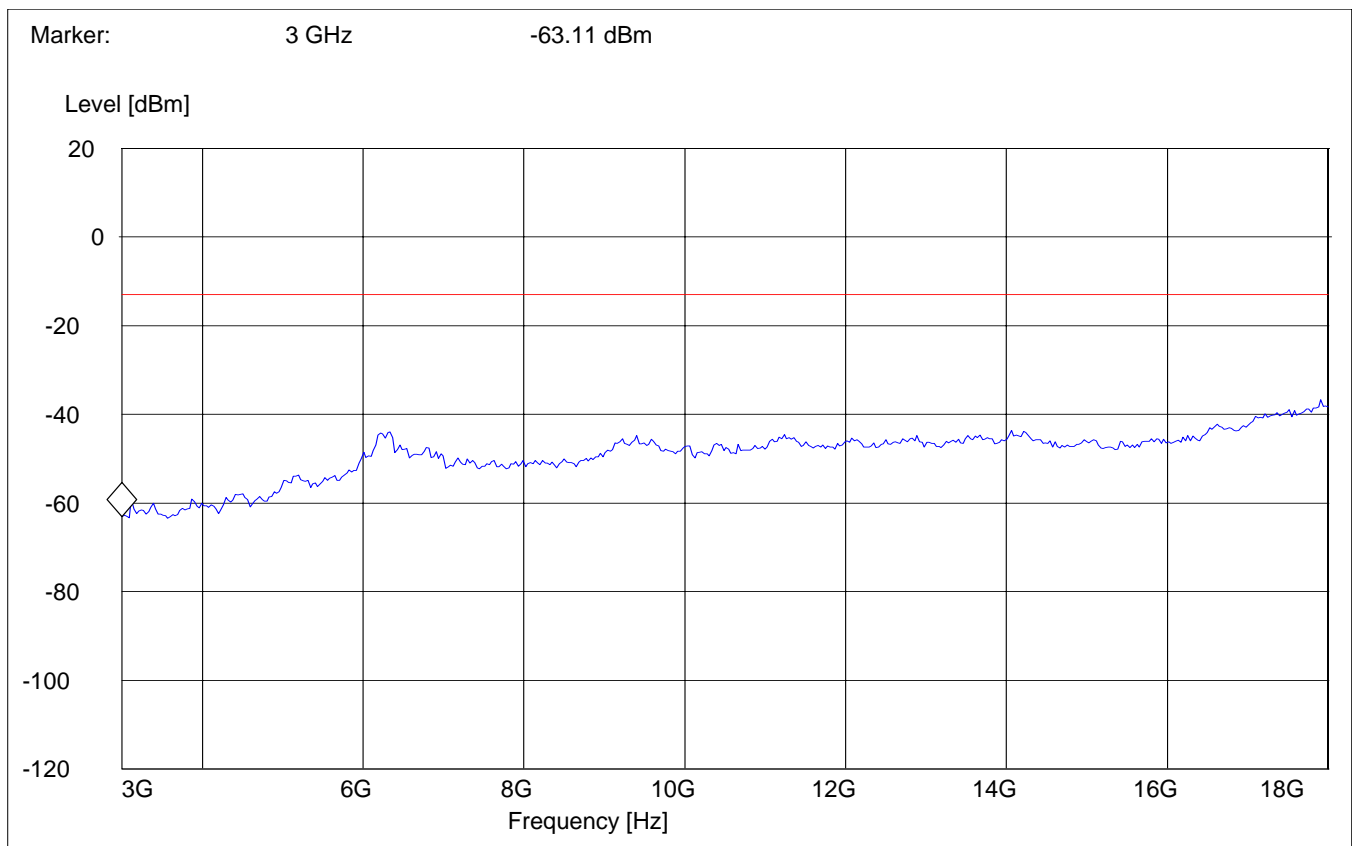
**RADIATED SPURIOUS EMISSIONS (IDLE MODE)**

**EUT in Idle Mode: 3GHz – 18GHz**

Spurious emission limit -13dBm

**SWEEP TABLE: "FCC 24 spuri 3-18G"**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz





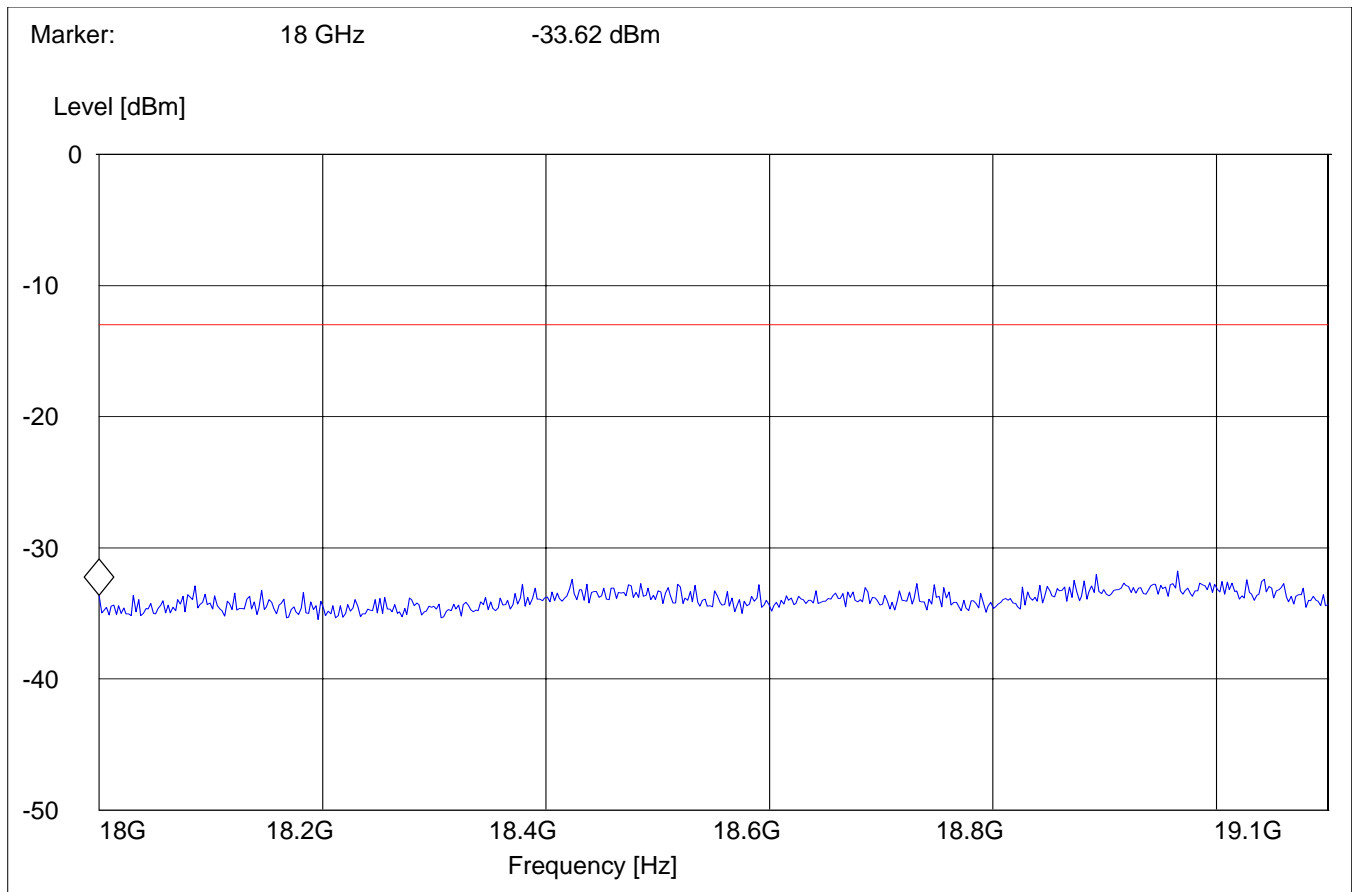
**RADIATED SPURIOUS EMISSIONS (IDLE MODE)**

**EUT in Idle Mode: 18GHz – 19.1GHz**

Spurious emission limit –13dBm

*SWEEP TABLE: "FCC 24 spuri 18-19.1G"*

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	19.1GHz	Max Peak	Coupled	1 MHz	1 MHz



**RECEIVER RADIATED EMISSIONS****§ 2.1053 / RSS-133****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 3GHz and 19.1GHz very short cable connections to the antenna was used to minimize the noise level.
2. Receiver radiated emissions were done on both 850/1900 bands, but only worst-case plots are submitted in the test reports.

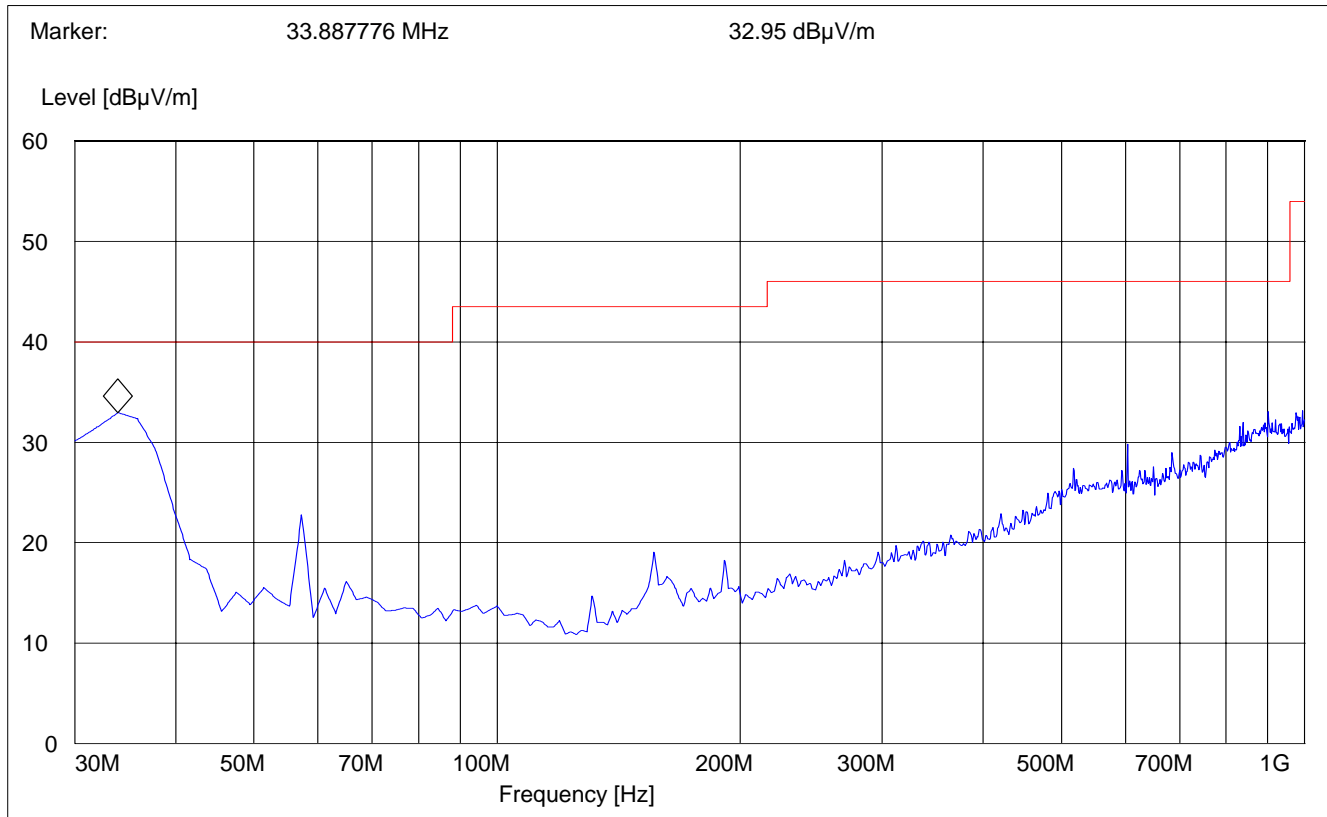
**Limits****SUBCLAUSE § RSS-133**

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

**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 30MHz – 1GHz**  
**Antenna: vertical**

**SWEEP TABLE: "FCC Spur 30M-1G"**

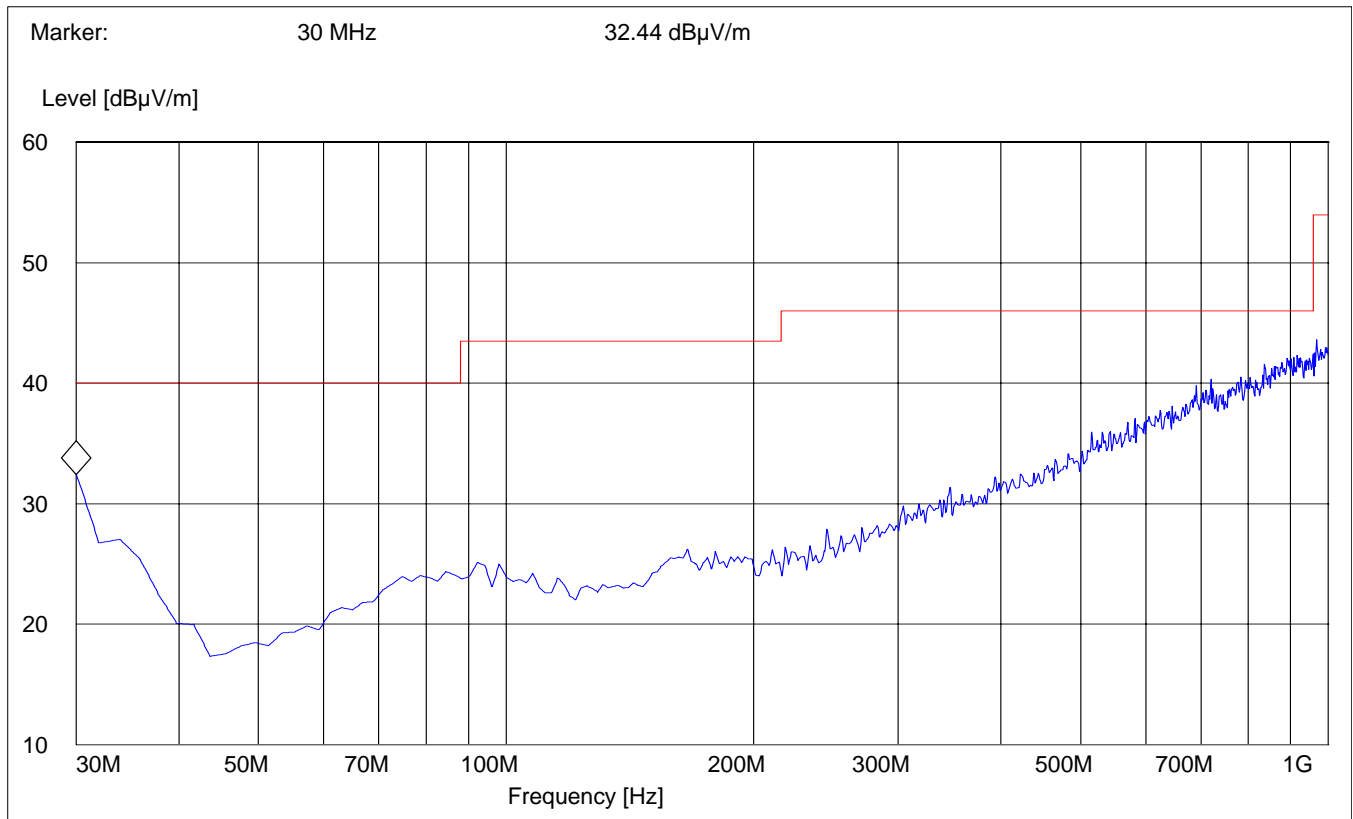
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz



**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 30MHz – 1GHz**  
**Antenna: horizontal**

**SWEEP TABLE: "FCC Spur 30M-1G"**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz

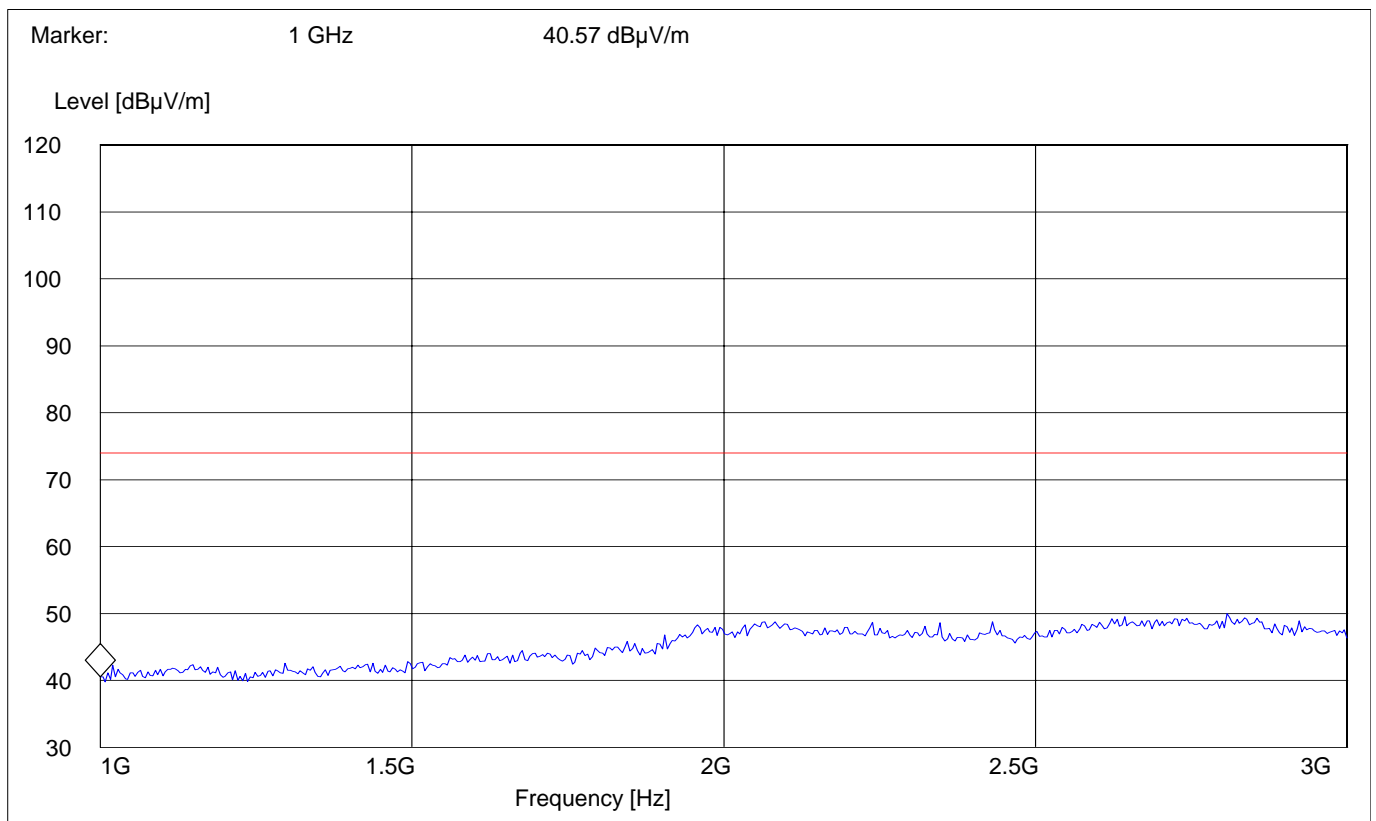


**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 1GHz – 3GHz**

**Note: marked peak is downlink from the base station**

**SWEEP TABLE: "FCC Spuri 1-3G"**

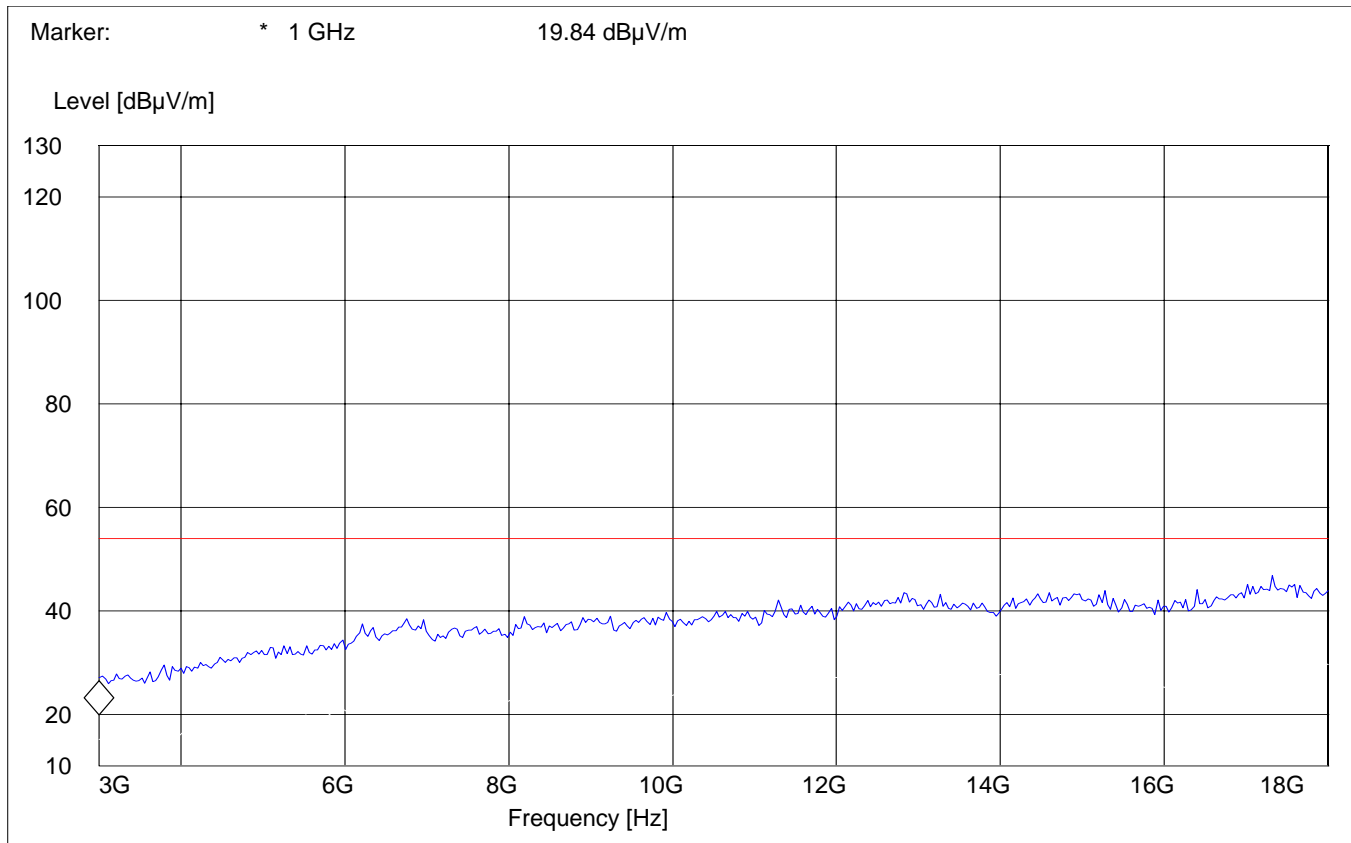
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz



**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 3GHz – 18GHz**

*SWEEP TABLE: "FCC spuri 3-18G"*

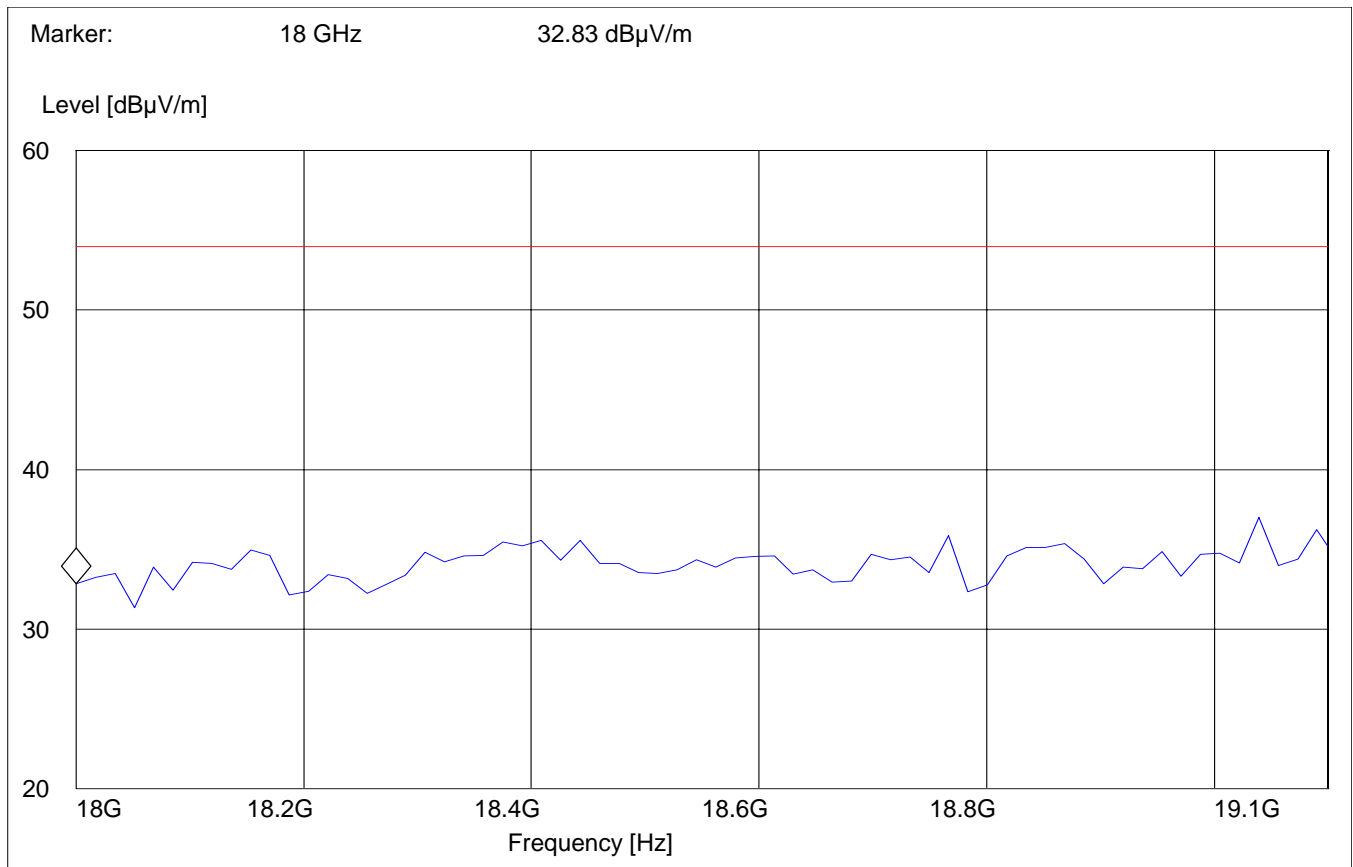
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz



**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 18GHz – 19.1GHz**

*SWEEP TABLE: "FCC spuri 18-19.1G"*

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	19.1GHz	Max Peak	Coupled	1 MHz	1 MHz



**CONDUCTED EMISSIONS**

§ 15.107/207

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

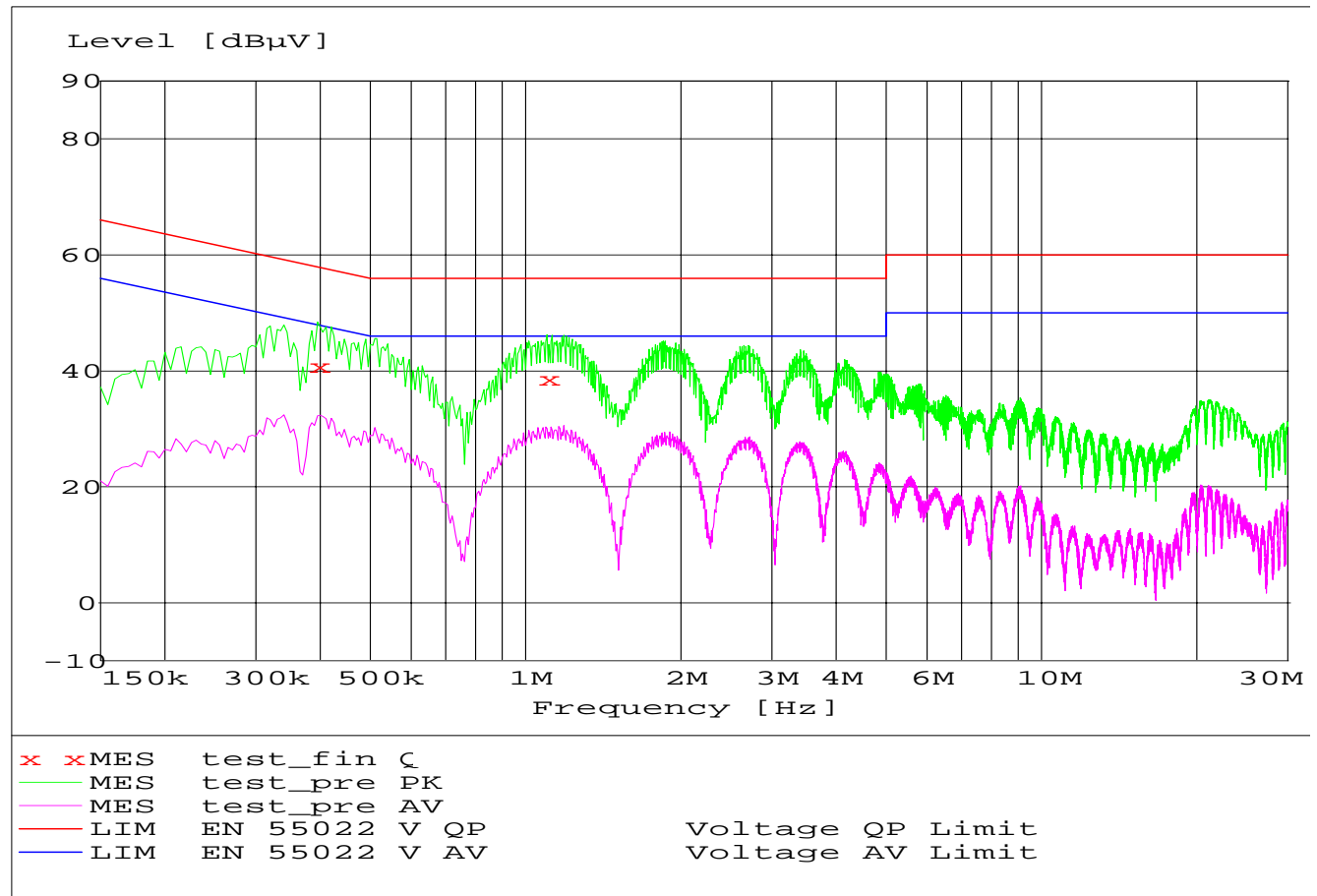
**Limit**

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	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





**MEASUREMENT RESULT: "test\_fin QP"**

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Line	PE
0.395000	40.80	0.0	58	17.2	L1	GND
1.100000	38.50	0.0	56	17.5	L1	GND

**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	Biconilog Antenna	3141	EMCO	0005-1186
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240
08	Power Splitter	11667B	Hewlett Packard	645348
09	Climatic Chamber	VT4004	Voltsch	G1115
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307
12	Pre-Amplifier	JS4-00102600	Miteq	00616
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06

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

**ANECHOIC CHAMBER**

