



FCC Test Report

Test report no.: EMC439FCC24/2003
FCC Part 24 / RSS 133
(IX-550)

FCC ID: KBCIX550AC750



Accredited according to ISO/IEC 17025



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. 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: Philip Kim****1.2 Testing laboratory****CETECOM Inc.**

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1.3 Details of applicant

Name : **Itronix Coporation**
Street : **804 South Stevens St.**
City / Zip Code : **Spokane, WA 99204**
Country : **USA**
Contact : **Mr. Richard Sargent**
Telephone : **509-742-1253**
Tele-fax : **509-742-1672**
e-mail : sargent@itronix.com

1.4 Application details

Date of receipt of application : 2003-03-05
Date of receipt test item : 2003-03-05
Date of test : 2003-03-13, 2003-03-19 & 2003-04-05

1.5 Test item

Manufacturer : **Itronix**
Model No. : **IX-550**
Description : [Ruggedized Laptop with GSM/GPRS radios](#)
HW & SW
FCC-ID : **KBCIX550AC750**

Additional information

Frequency : **GSM 900/1800/1900 MHz**
Type of modulation : **GMSK**
Number of channels : **299 (in PCS 1900)**
Antenna : **Whip; Monopole**
Power supply : **5.0Vdc**
Output power : **Maximum Output Power 0.6W (27.64dBm) EIRP.**
Extreme vol. Limits : **Lower Limit: 4.5Vdc**
Nominal Voltage: 5.5.Vdc
Upper Limit: 5.5Vdc
Extreme temp. Tolerance : **Lower Limit: -20°C**
Upper Limit: 60°C

1.6 Test standards

FCC Part 24 / RSS133 r1

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:

2003-04-17 EMC & Radio Lothar Schmidt (Manager)

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

2003-04-15 EMC & Radio Philip Kim (EMC Engineer)

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

2.2 Test report

TEST REPORT

**Test report no.: EMC439FCC24/2003
(IX-550)**

TEST REPORT REFERENCE

PARAMETER TO BE MEASURED	PARAGRAPH	PAGE
POWER OUTPUT	SUBCLAUSE § 24.232	7
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POWER OUTPUT**SUBCLAUSE § 24.232(b)****Summary:**

This paragraph contains both average and peak conducted output power measurements for the EUT.
In any case, the peak output power comply with the specified limits

Limits:

Power Step	Nominal Peak Output Power (dBm)	Tolerance (dB)
0	+30	± 2

According GSM specifications

Power Measurements:**Conducted:**

Frequency (MHz)	Power Step	Peak Output Power (dBm)	Average Output Power during burst (dBm)
1850.2	0	28.02	18.78
1880.0	0	27.64	18.40
1909.8	0	27.77	18.53
Measurement uncertainty		±0.5 dB	

ANALYZER SETTINGS: RBW = 3MHz VBW = 3MHz

EIRP

Note: EIRP is calculated value from the measured Antenna Gain

Antenna gain - calculated from the difference of conducted power and EIRP measured with Sierra Wireless card AC555.

Frequency (MHz)	Antenna Gain (dBi)
1850.2	-0.25
1880.0	1.08
1909.8	-1.74
average	-0.38

In any case, the peak output power comply with the specified limits

Limits:

Power Step	Peak Power EIRP (dBm)
0	≤30

Max. output power according the GSM specification

Radiated:

For the EIRP calculation the real values at the relevant frequencies (see antenna gain table above) were used.

Frequency (MHz)	Power Step	Peak Output Power (dBm)	
		EIRP	ERP
1850.2	0	27.95	25.85
1880.0	0	28.72	26.62
1909.8	0	26.03	23.93
Measurement uncertainty		±0.5 dB	

FREQUENCY STABILITY**§2.1055 / § 24.235****Method of Measurement:**

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of a R&S CMD 55 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30 C.
3. With the EUT, powered via nominal voltage, connected to the CMD 55 and in a simulated call on channel 661 (centre channel), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the EUT, to prevent significant self warming.
4. Repeat the above measurements at 10 C increments from -30 C to +50 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1 Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50 C.
7. With the EUT, powered via nominal voltage, connected to the CMD 55 and in a simulated call on channel 661 (centre channel), measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50 C to -30 C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5 C during the measurement procedure.

Measurement Limit:**For Hand carried battery powered equipment:**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 4.5VDC and 5.5VDC, with a nominal voltage of 5.5.VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -0.18% and +0.0%. For the purposes of measuring frequency stability these voltage limits are to be used.

AFC FREQ ERROR vs. VOLTAGE

Frequency = 1800MHz

Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
3.1 volt	-4.58	-0.0025
3.3 volt	-3.55	-0.0020
3.5 volt	-1.87	-0.0010
4.5 volt	-28.02	-0.0156
4.7 volt	-11.11	-0.0062
4.9 volt	-15.37	-0.0085
5.0 volt	-16.21	-0.0090
5.1 volt	-11.69	-0.0065
5.3 volt	-14.21	-0.0079
5.5 volt	-19.44	-0.0108

AFC FREQ ERROR vs. TEMPERATURE

TEMPERATURE (°C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	-76.7	-0.0426
-20	-47.14	-0.0262
-10	-39.45	-0.0219
0	-24.99	-0.0139
+10	-16.08	-0.0089
+20	-16.21	-0.0090
+30	-10.59	-0.0059
+40	-6.72	-0.0037
+50	-24.47	-0.0136

OCCUPIED BANDWIDTH**§24.238(b)****Occupied Bandwidth Results**

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the USPCS frequency band. Table below lists the measured 99% power and -26dBC occupied bandwidths.

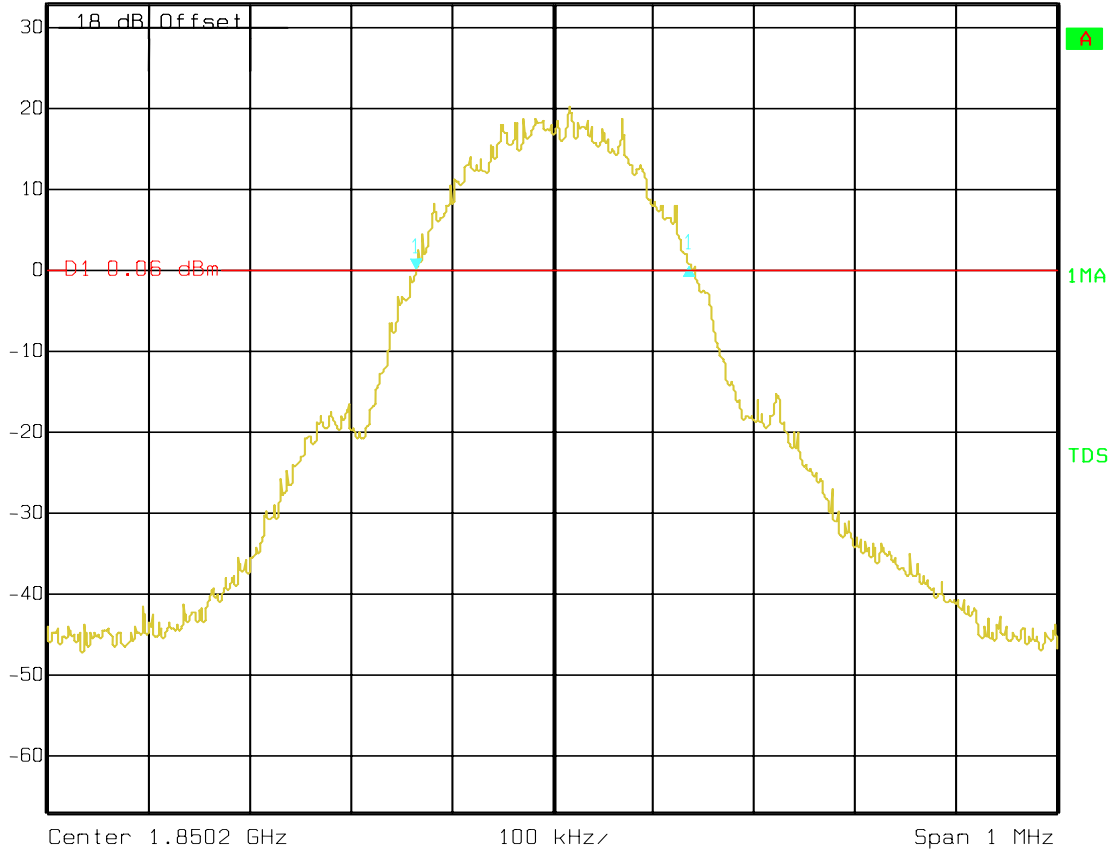
Frequency	99% Occupied Bandwidth (KHz)	-26 dBc Bandwidth (KHz)
1850.2 MHz	270.54	318.63
1880.0 MHz	280.56	314.62
1909.2 MHz	280.56	312.62

Part 24.238 (a) requires a measurement bandwidth of at least 1% of the -26dBc occupied bandwidth. The worst case of -26dBc is 318.63 kHz and 1% of this equates to a resolution bandwidth of at least 3.18kHz. Therefore, resolution bandwidth 3.0 kHz was used in Part 24.238(a).

Channel 512
99% Occupied Bandwidth



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	30 dB
33 dBm	0.37 dB	VBW	3 kHz		
	270.54108216 kHz	SWT	280 ms	Unit	dBm

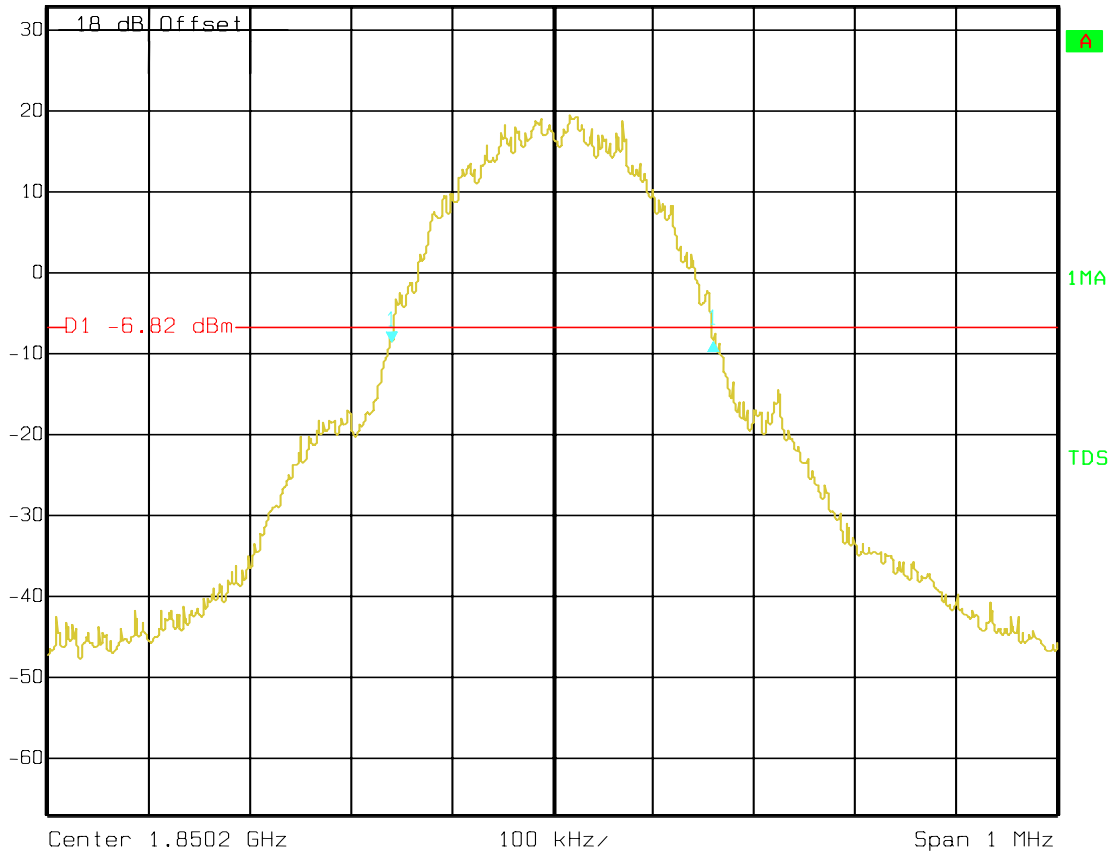


Date: 8.NOV.01 19:15:10

Channel 512 -26 dBc Bandwidth

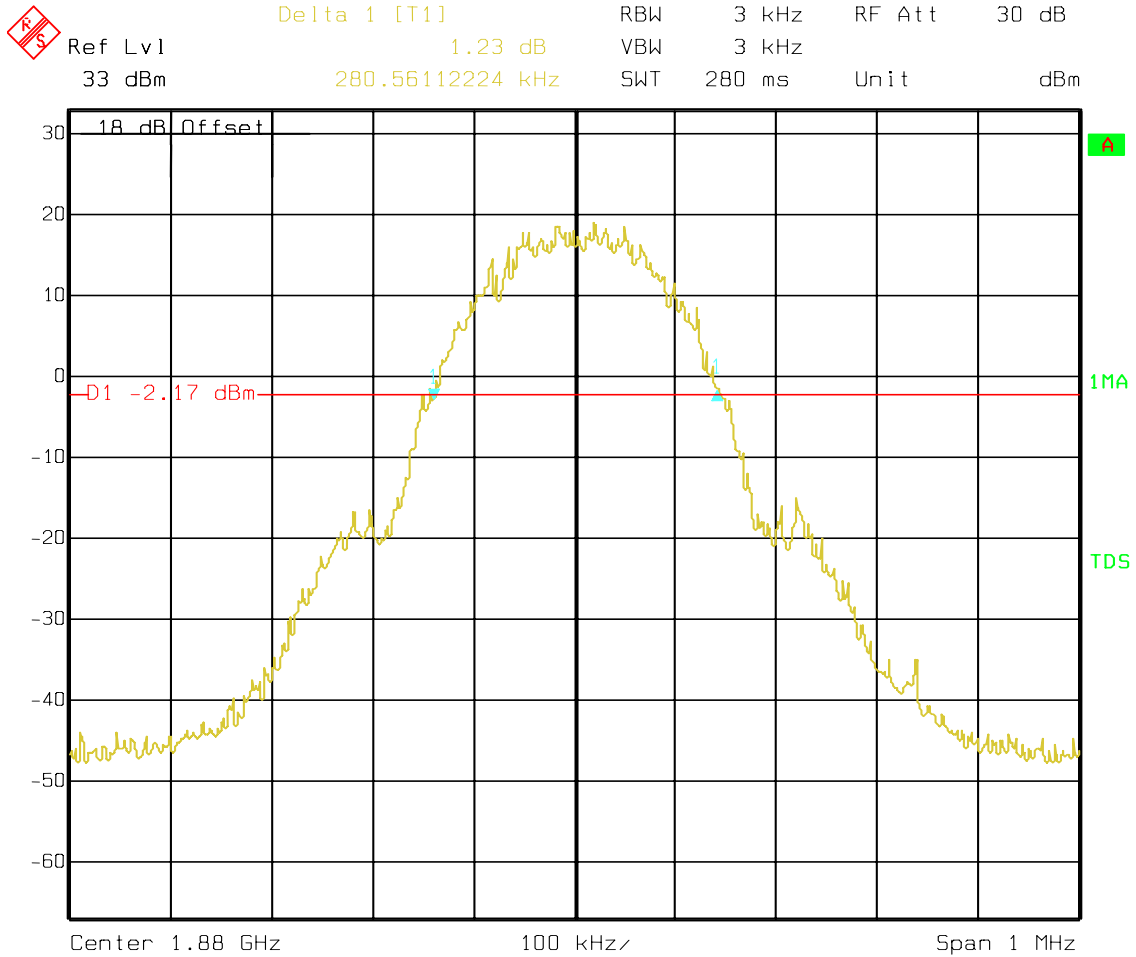


Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	30 dB
33 dBm	0.38 dB	VBW	3 kHz		
	318.63727455 kHz	SWT	280 ms	Unit	dBm



Date: 8.NOV.01 19:12:59

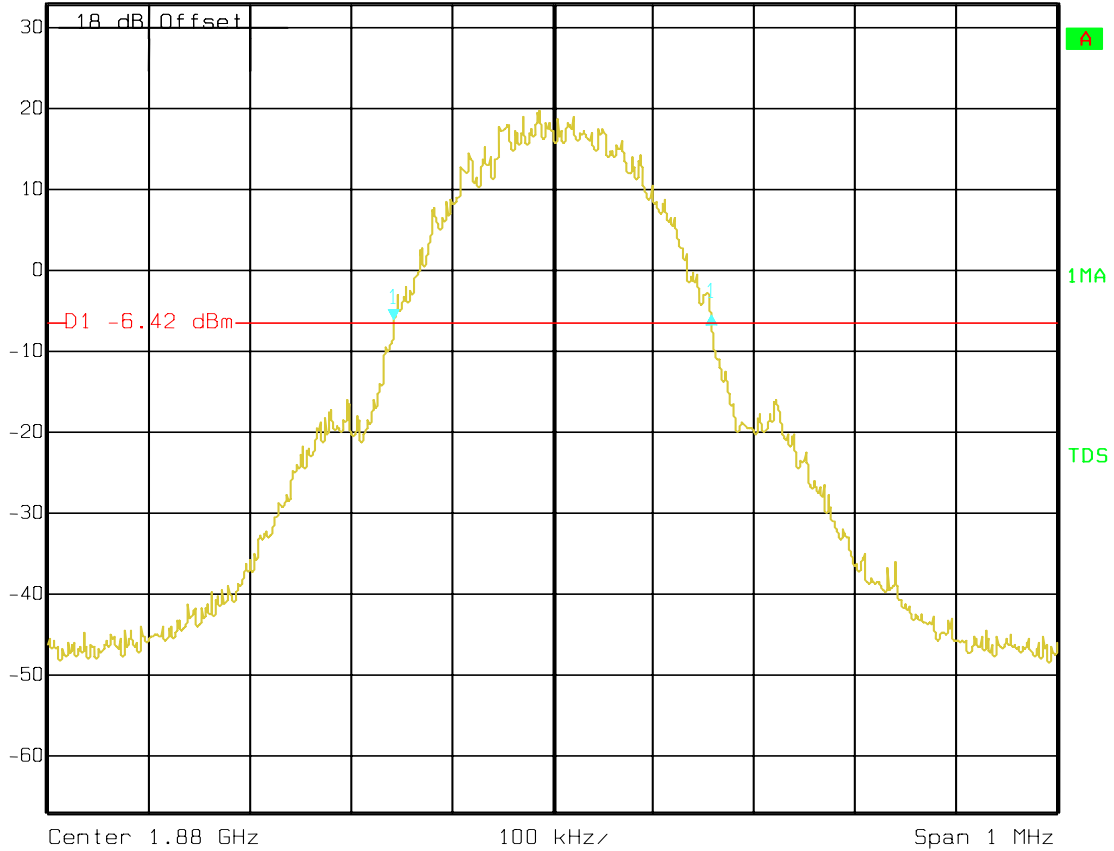
Channel 661 99% Occupied Bandwidth



Date: 8.NOV.01 19:20:25

Channel 661 -26 dBc Bandwidth

	Delta 1 [T1]	RBW	3 kHz	RF Att	30 dB
	0.65 dB	VBW	3 kHz		
	314.62925852 kHz	SWT	280 ms	Unit	dBm

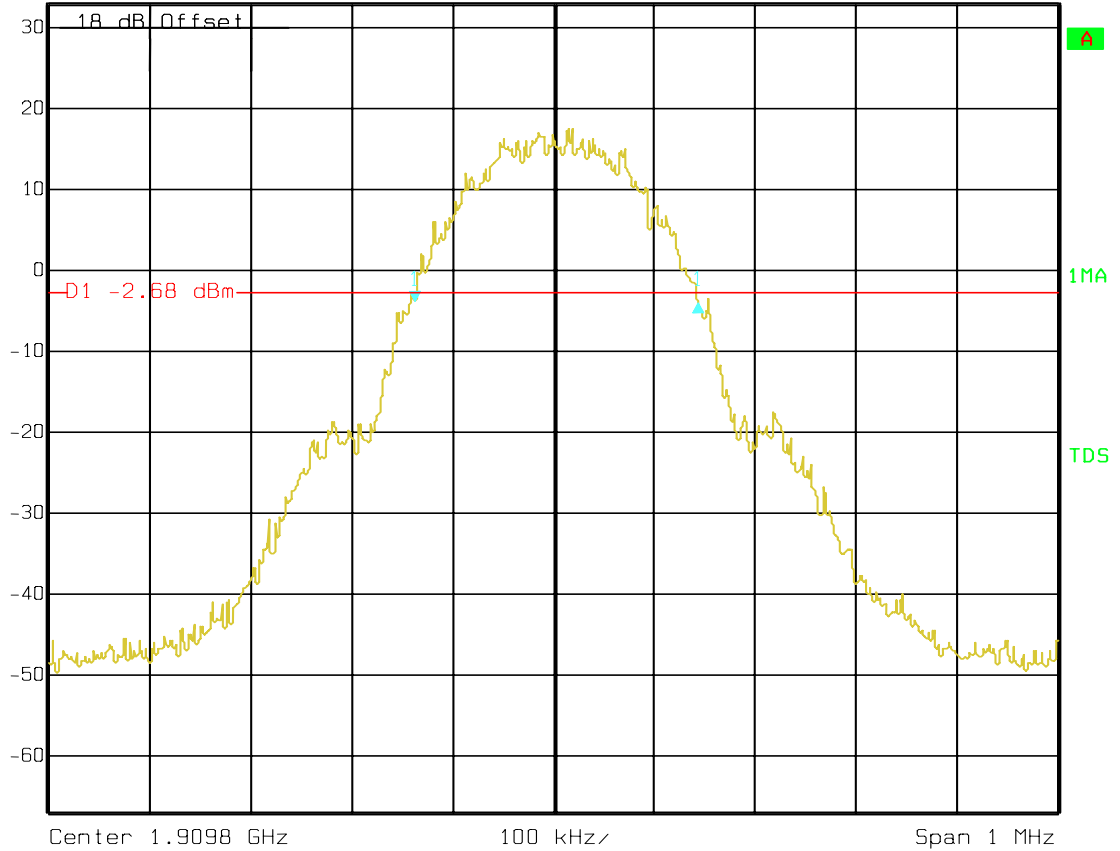


Date: 8.NOV.01 19:18:05

Channel 810
99% Occupied Bandwidth



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	30 dB
33 dBm	0.15 dB	VBW	3 kHz	Unit	dBm
	280.56112224 kHz	SWT	280 ms		

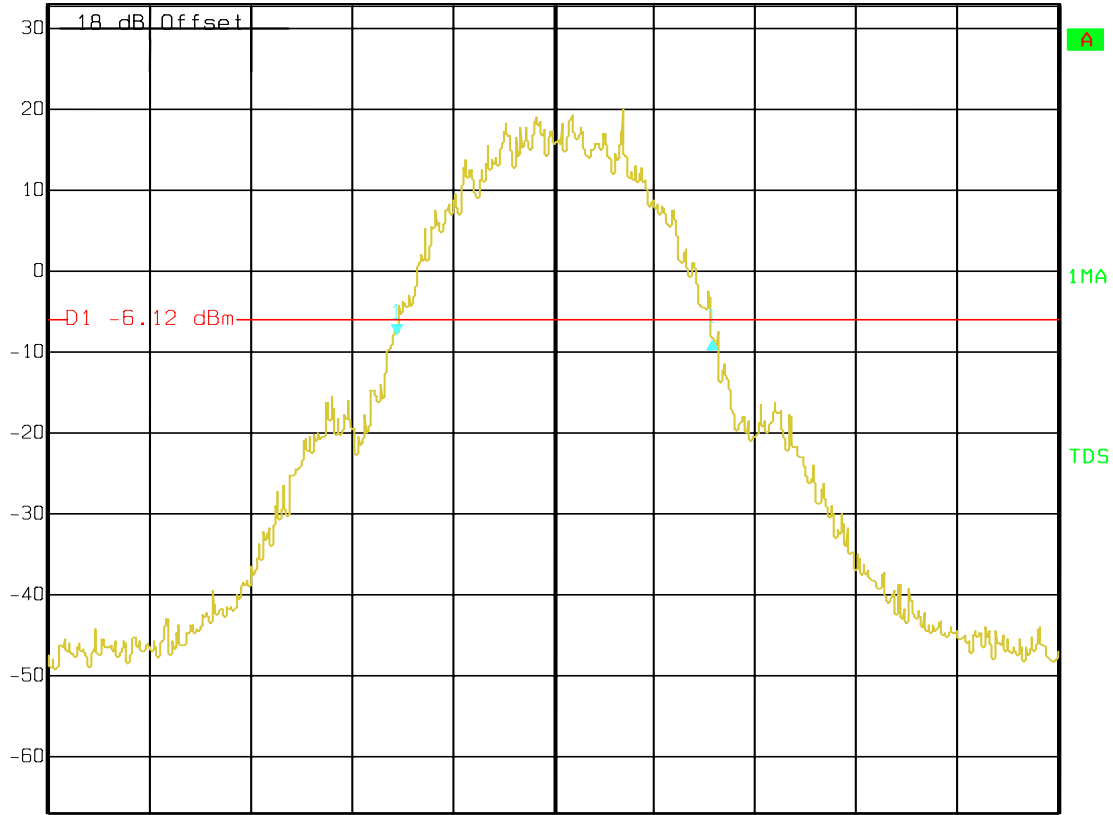


Date: 8.NOV.01 19:27:08

Channel 810
-26 dBc Bandwidth



Ref Lvl	Delta 1 [T1]	RBW	3 kHz	RF Att	30 dB
33 dBm	-0.37 dB	VBW	3 kHz		
	312.62525050 kHz	SWT	280 ms	Unit	dBm



Center 1.9098 GHz 100 kHz/ Span 1 MHz

Date: 8.NOV.01 19:24:35

EMISSIONS LIMITS**§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 – 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, which is the transmitted carrier that can be as high as 1910 MHz. 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 USPCS 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 wave-guide 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 EIRP 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 USPCS band (1850.2 MHz, 1880 MHz and 1909.8 MHz). 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 USPCS band into any of the other blocks. 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.

NOTE: The spurious emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. For this reason the graphs show different noise levels.

RESULTS OF RADIATED TESTS FOR FCC-24:

Harmonic	Tx 1850.2 Freq.(MHz)	Level (dBm)	Tx 1880.0 Freq. (MHz)	Level (dBm)	Tx 1909.8 Freq. (MHz)	Level (dBm)
2	3700.4	-53.05	3760	-54.69	3819.6	-54.47
3	5550.6	-45.95	5640	-44.37	5729.4	-45.37
4	7400.8	-41.91	7520	-42.09	7639.2	-42.29
5	9251	-38.32	9400	-37.24	9549	-38.38
6	11101.2	-37.61	11280	-35.66	11458.8	-38.29
7	12951.4	-37.84	13160	-39.07	13368.6	-38.14
8	14801.6	-38.36	15040	-36.91	15278.4	-38.95
9	16651.8	-33.40	16920	-34.66	17188.2	-32.29
10	18502	-34.10	18800	-34.79	19098	-34.49

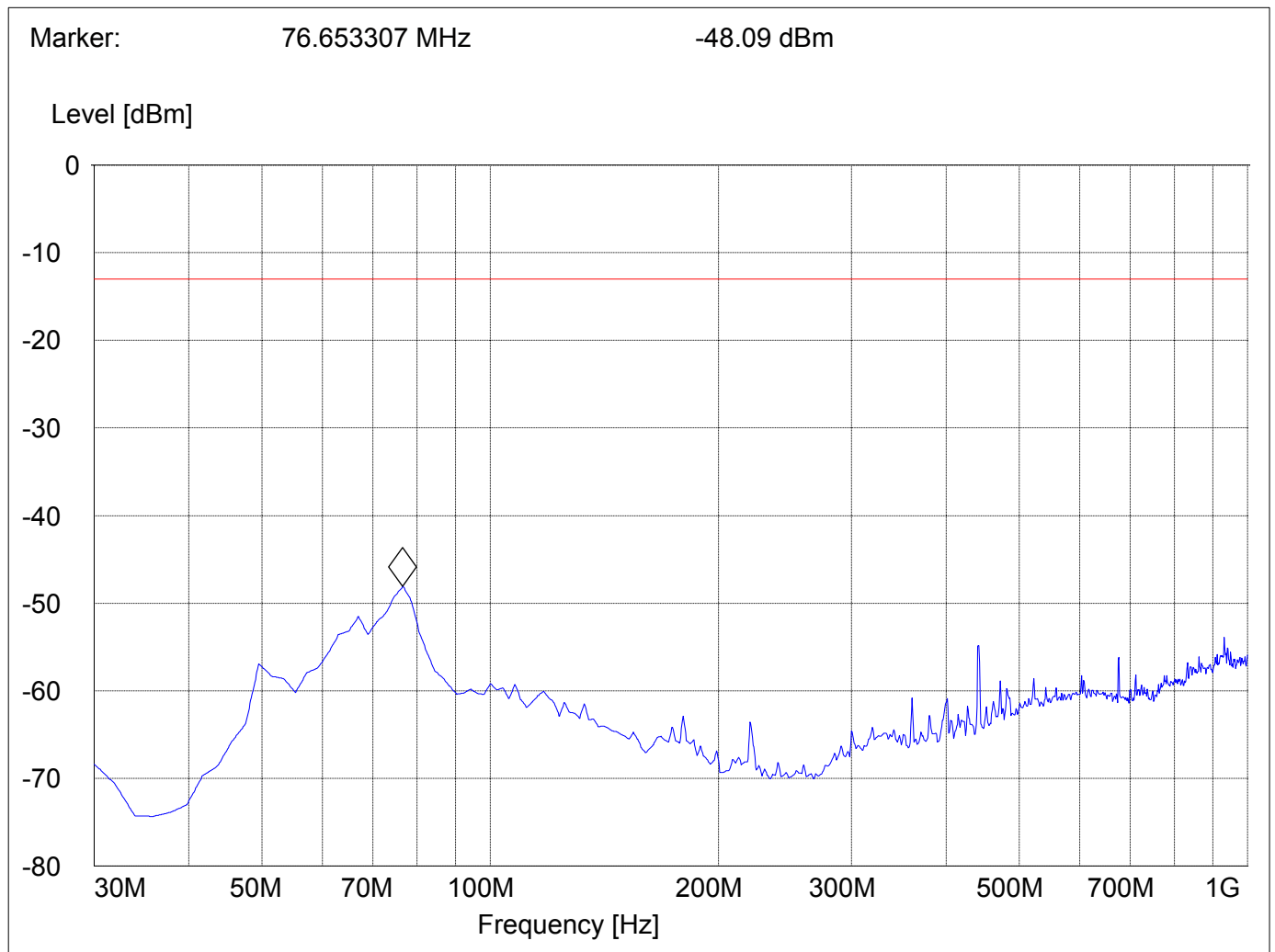
RADIATED SPURIOUS EMISSIONS

Tx Frequency 1850.2MHz: 30MHz - 1GHz

Spurious emission limit -13dBm

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

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



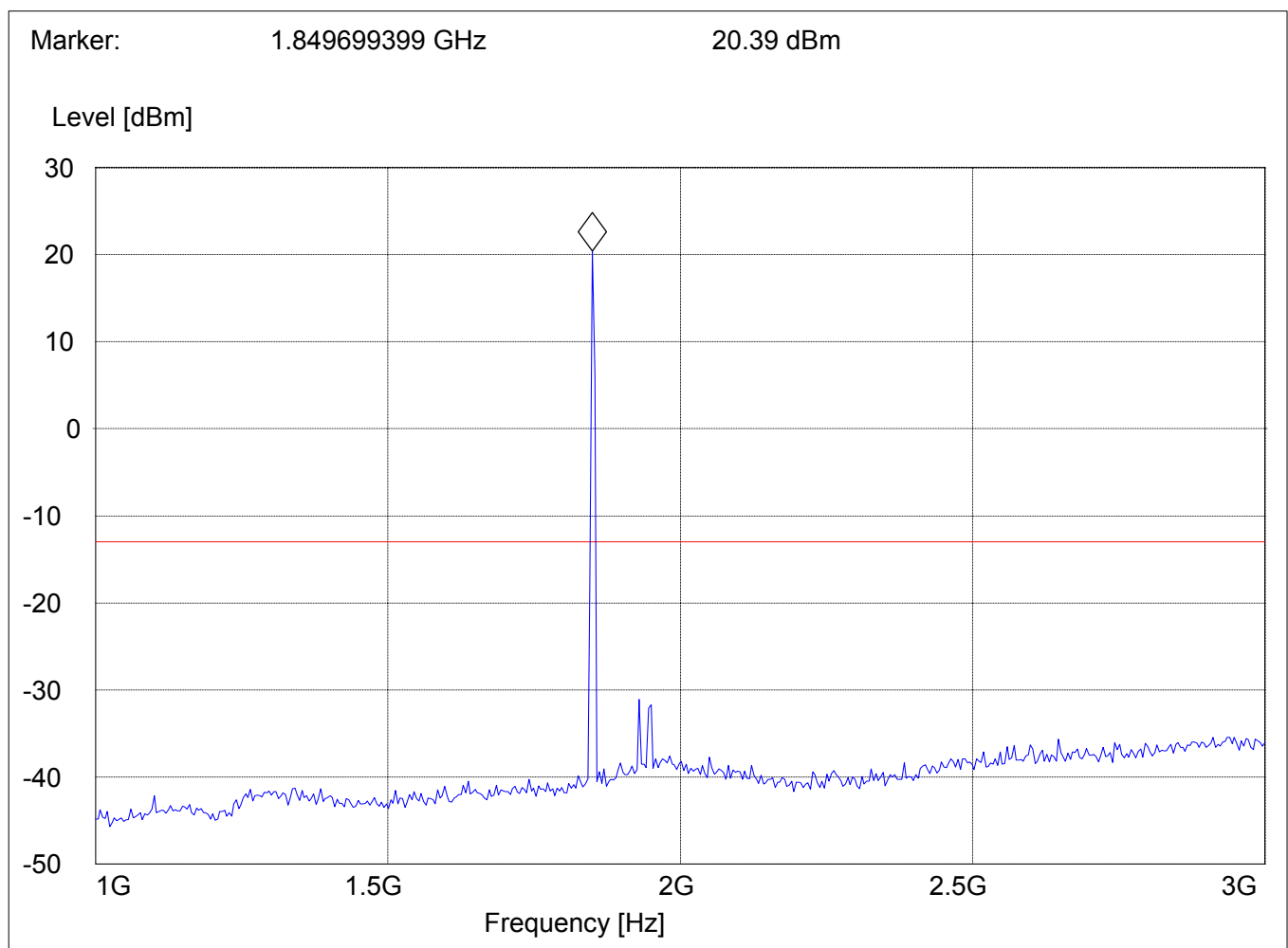
RADIATED SPURIOUS EMISSIONS**Tx Frequency 1850.2MHz: 1GHz – 3GHz**

Spurious emission limit -13dBm

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

SWEEP TABLE: "FCC Spuri 1-3G"

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

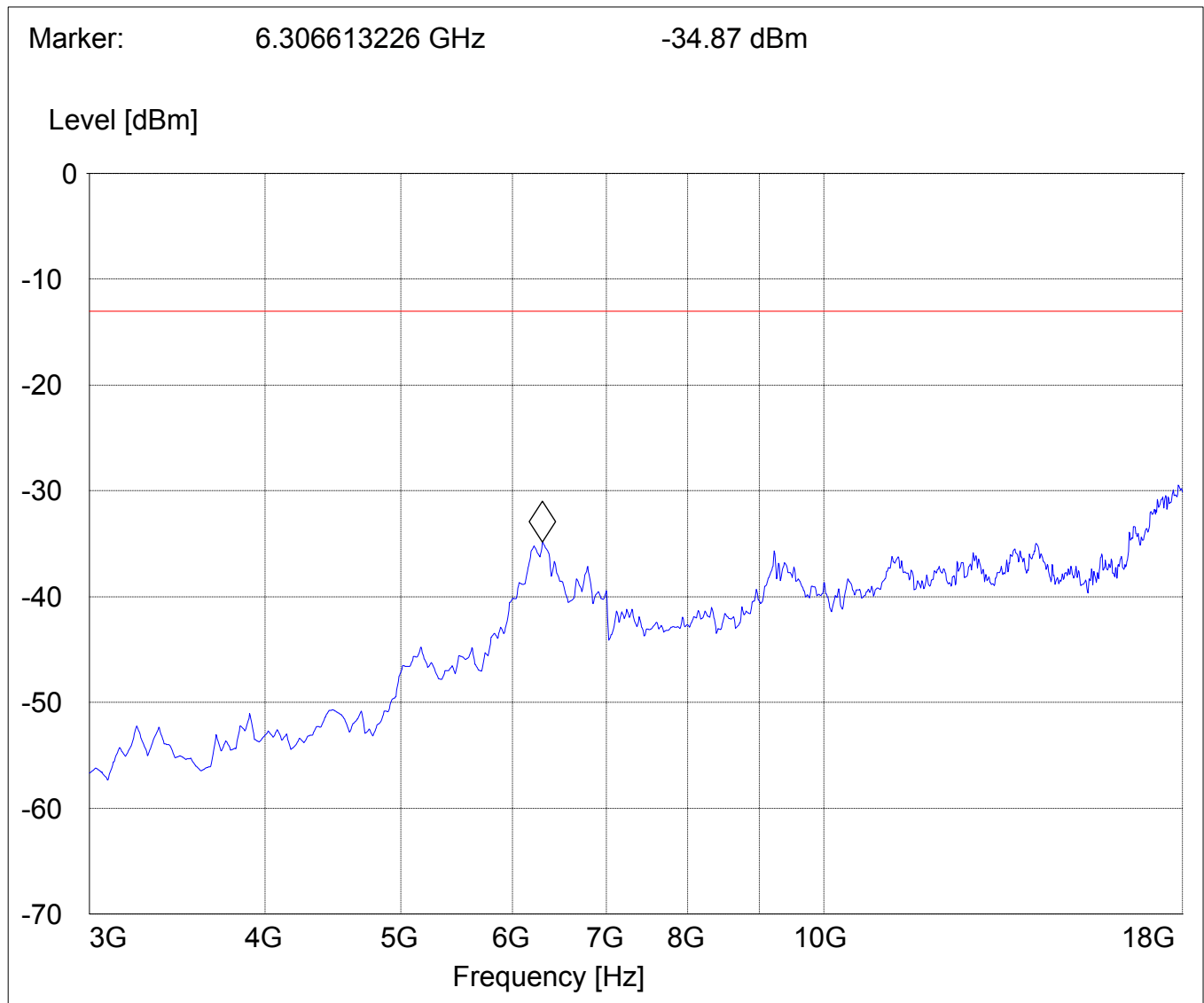


RADIATED SPURIOUS EMISSIONS**Tx Frequency 1850.2MHz: 3GHz – 18GHz**

Spurious emission limit -13dBm

SWEEP TABLE: "FCC Spuri 3-8G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW/VBW
3GHz	8GHz	Max Peak	Coupled	1 MHz



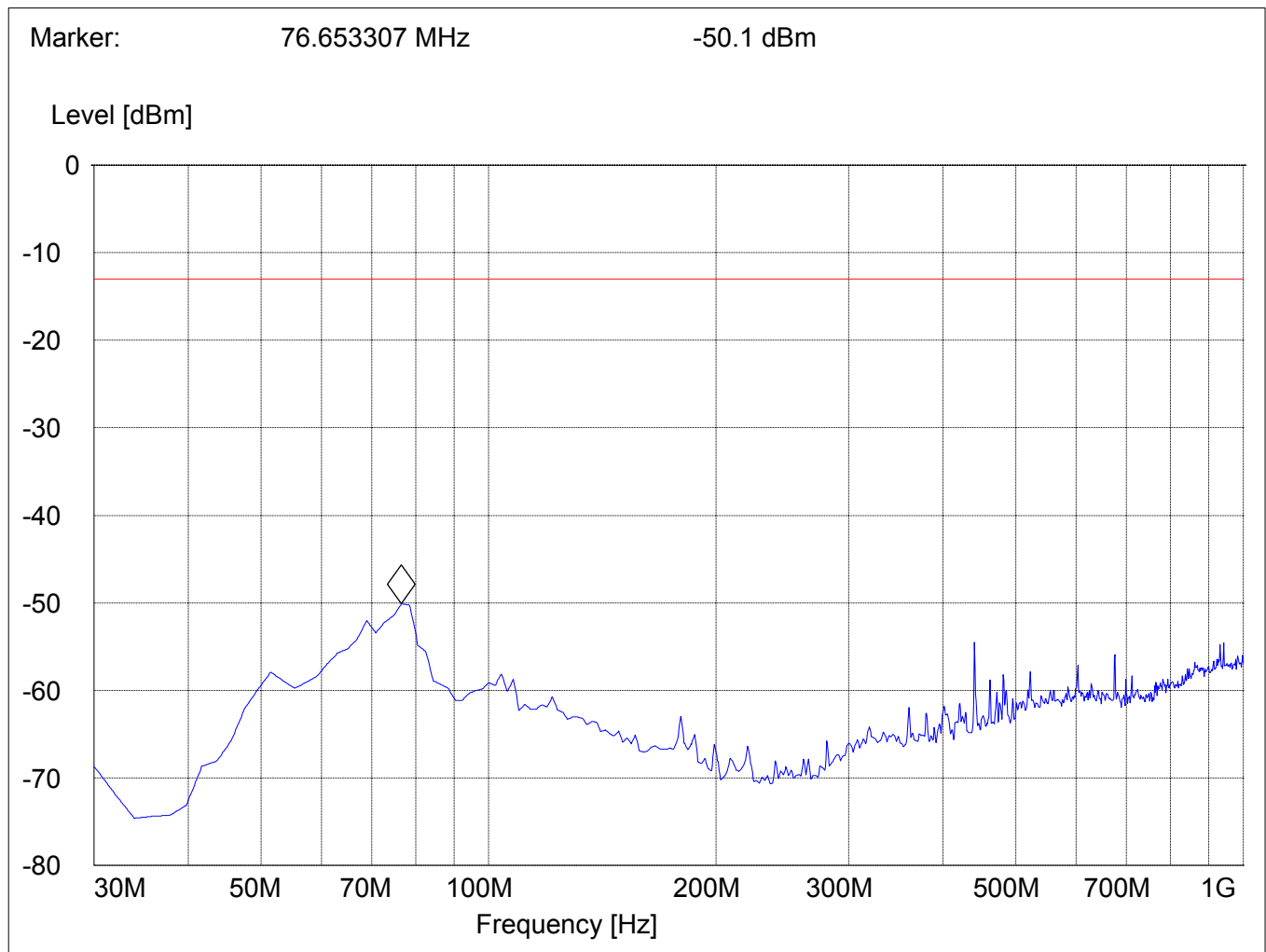
RADIATED SPURIOUS EMISSIONS

Tx Frequency 1880.0MHz: 30MHz –1GHz

Spurious emission limit –13dBm

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

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



RADIATED SPURIOUS EMISSIONS

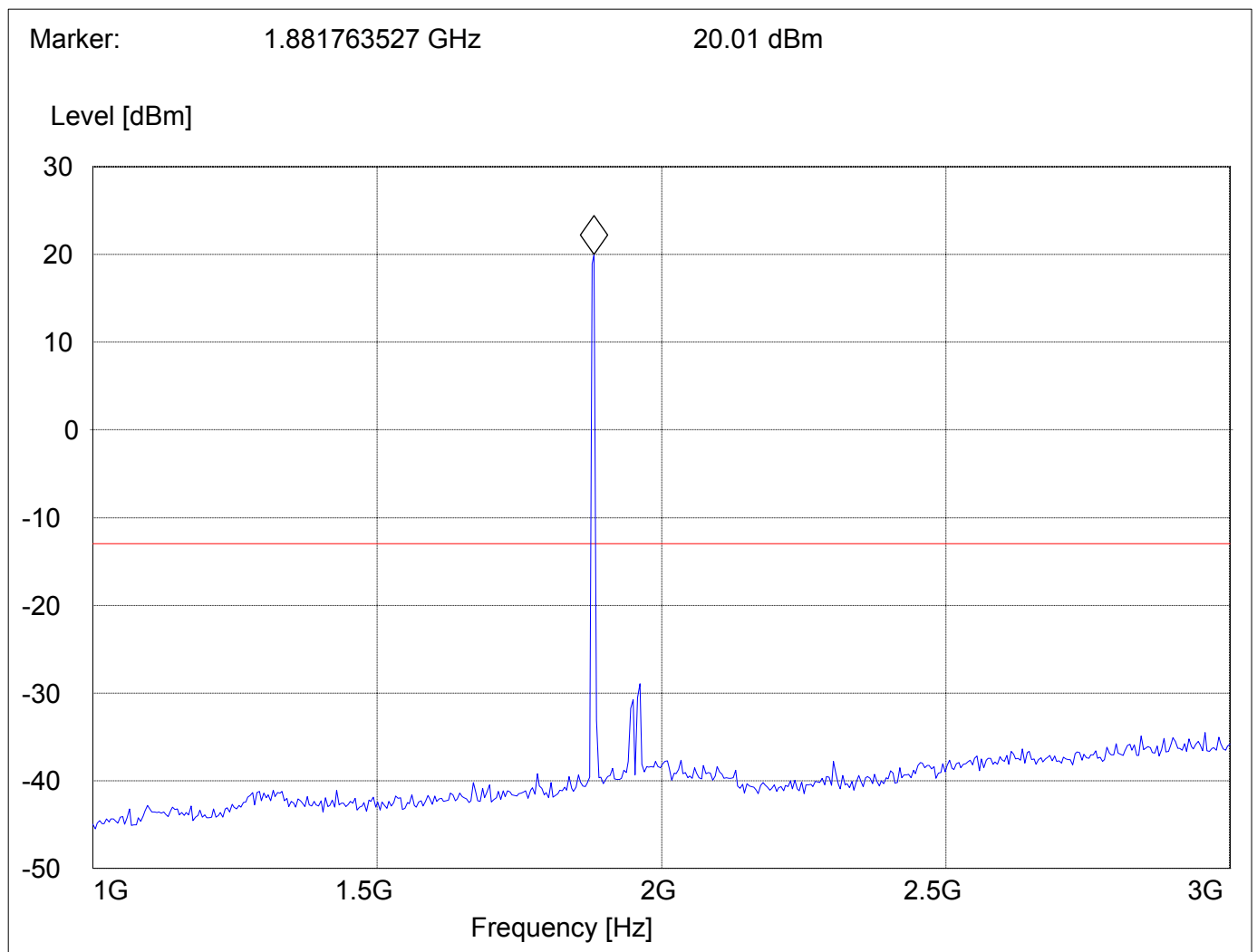
Tx Frequency 1880.0MHz: 1GHz – 3GHz

Spurious emission limit -13dBm

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

SWEEP TABLE: "FCC Spuri 1-3G"

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



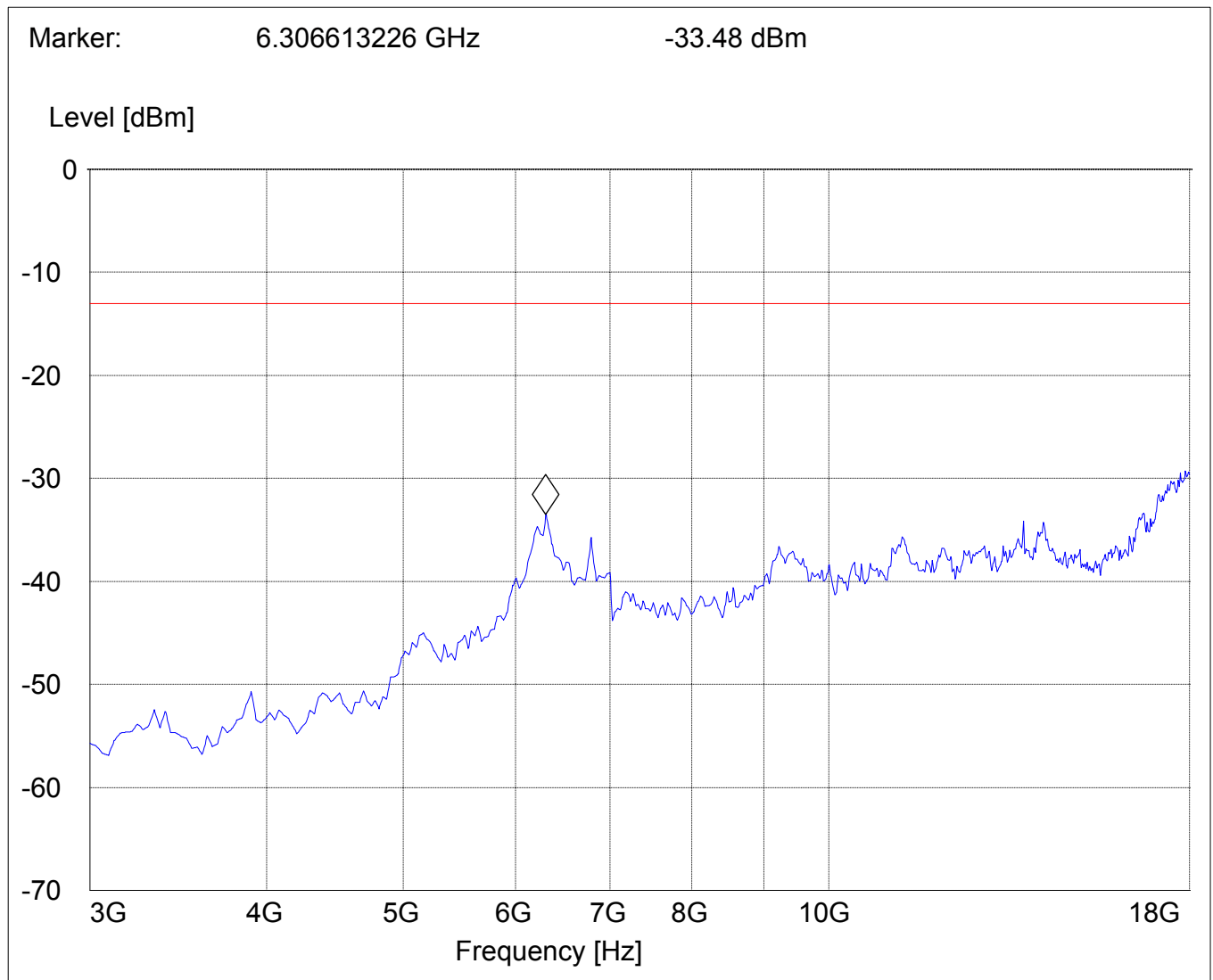
RADIATED SPURIOUS EMISSIONS

Tx Frequency 1880.0MHz: 3GHz – 18GHz

Spurious emission limit -13dBm

SWEEP TABLE: "FCC Spuri 3-8G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW/VBW
3GHz	8GHz	Max Peak	Coupled	1 MHz



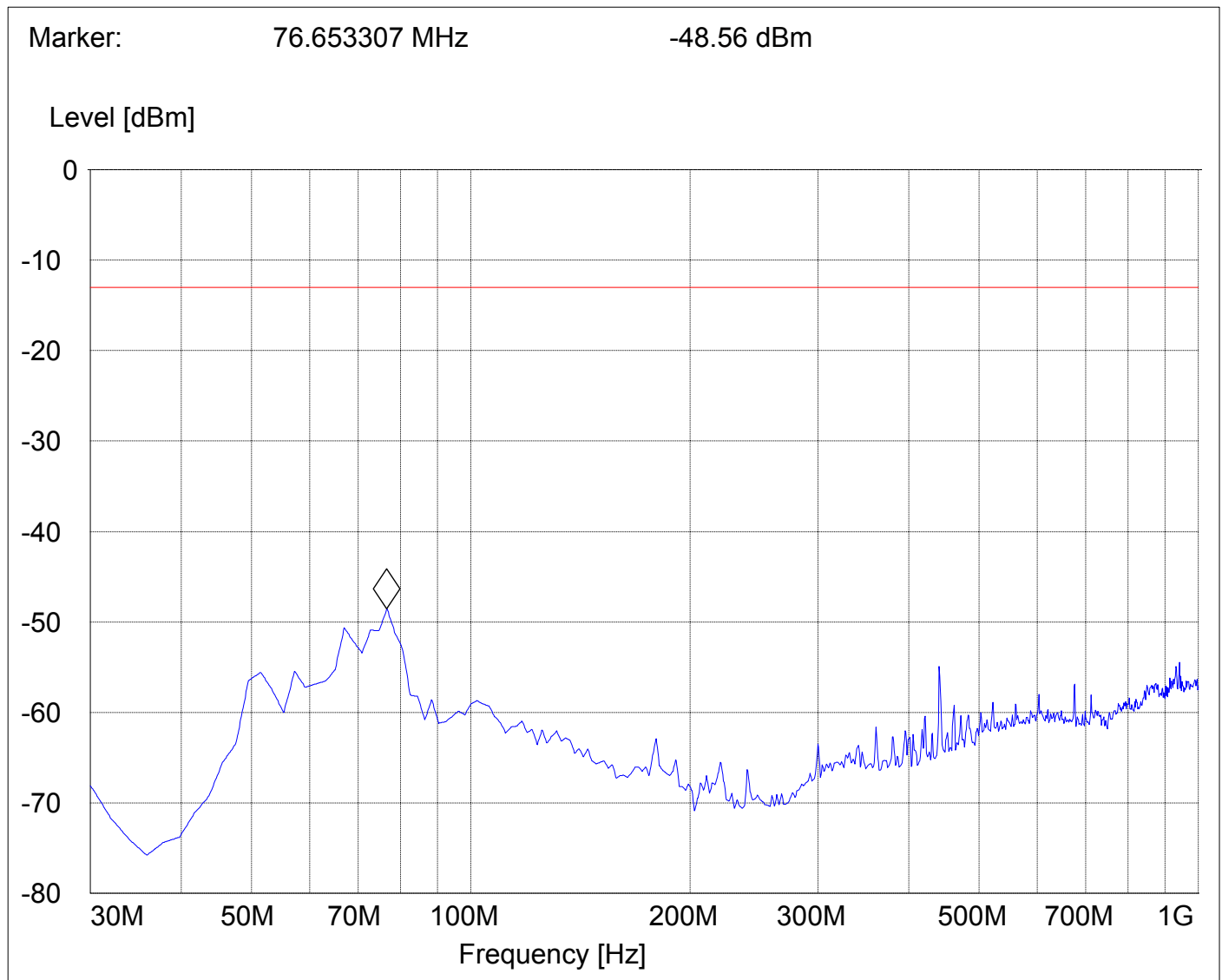
RADIATED SPURIOUS EMISSIONS

Tx Frequency 1909.8MHz: 30MHz – 1GHz

Spurious emission limit -13dBm

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

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



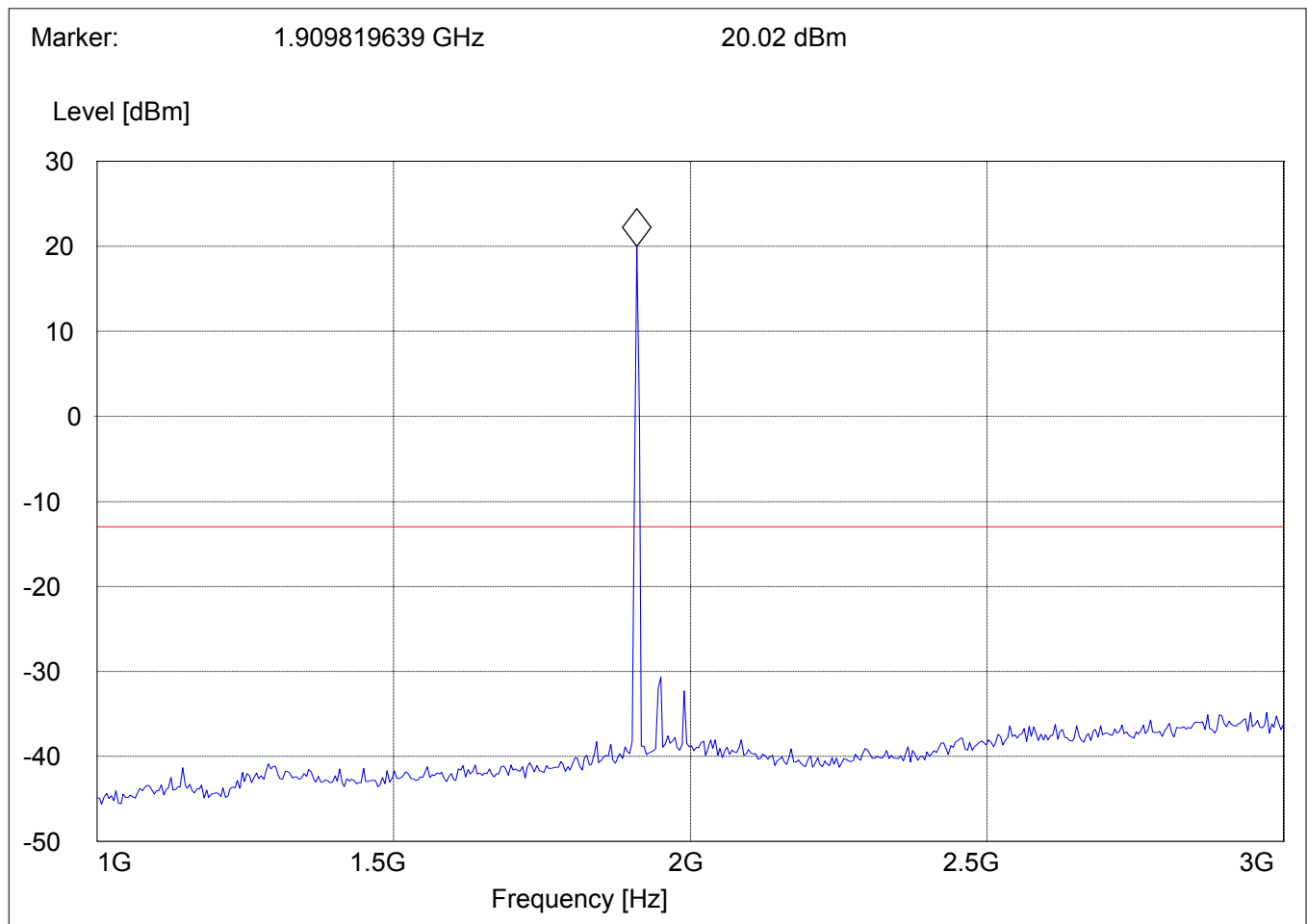
RADIATED SPURIOUS EMISSIONS**Tx Frequency 1909.8MHz: 1GHz – 3GHz**

Spurious emission limit -13dBm

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

SWEEP TABLE: "FCC Spuri 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



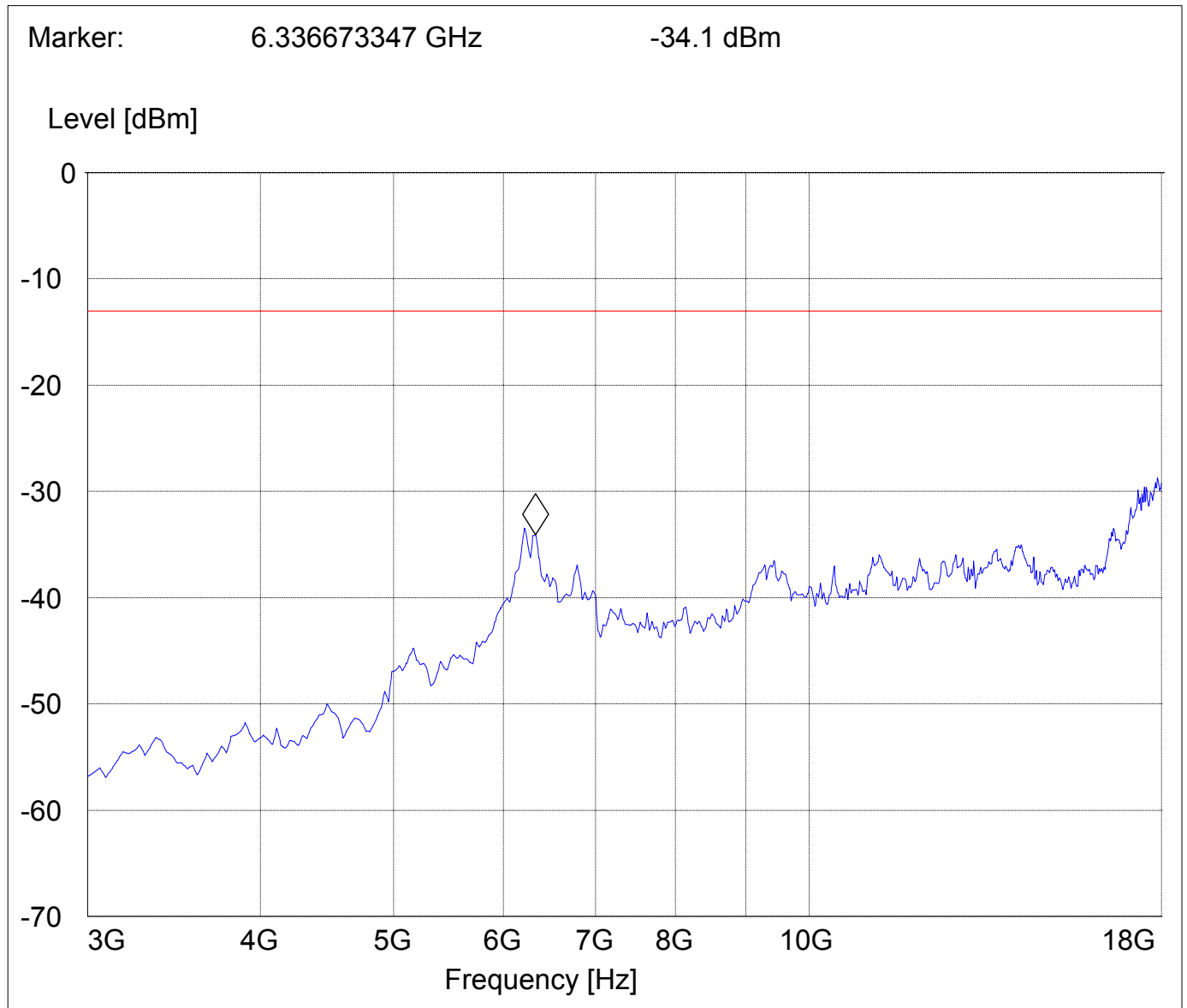
RADIATED SPURIOUS EMISSIONS

Tx Frequency 1909.8MHz: 3GHz – 18GHz

Spurious emission limit -13dBm

SWEEP TABLE: "FCC Spuri 3-8G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW/VBW
3GHz	8GHz	Max Peak	Coupled	1 MHz



RADIATED SPURIOUS EMISSIONS

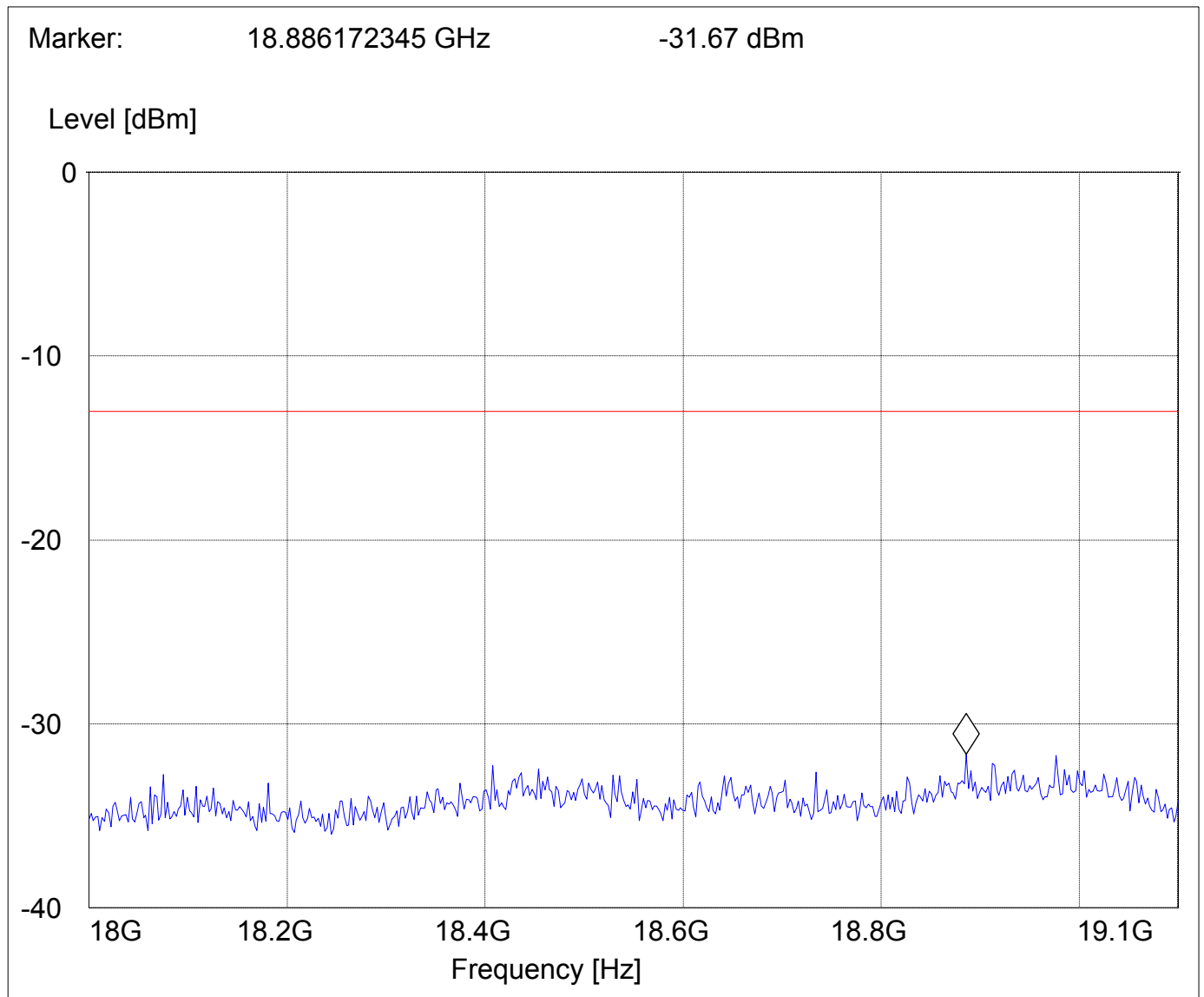
18GHz – 19.1GHz

Spurious emission limit -13dBm

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

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

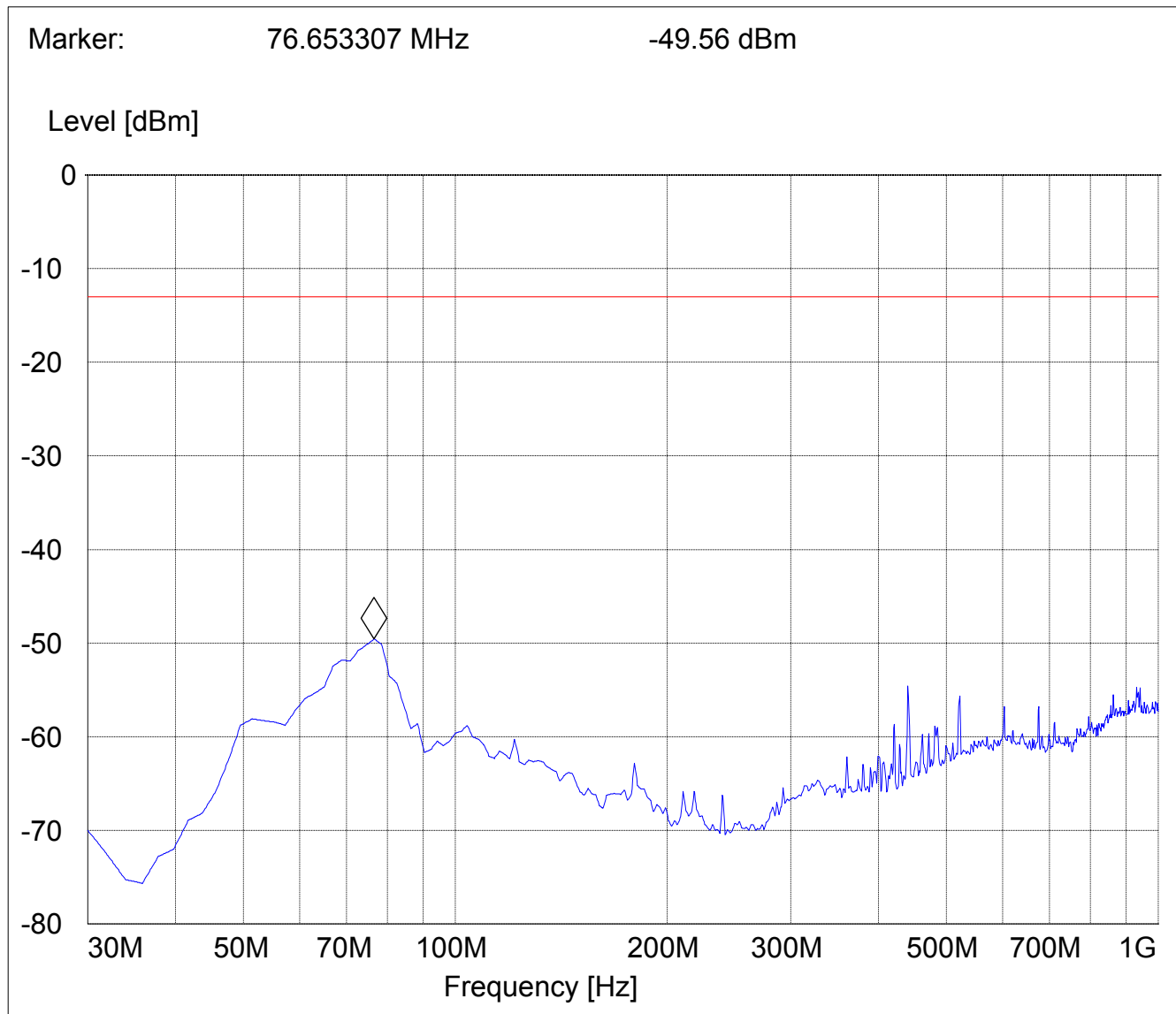


RADIATED SPURIOUS EMISSIONS**EUT in Idle Mode: 30MHz – 1GHz**

Spurious emission limit -13dBm

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

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



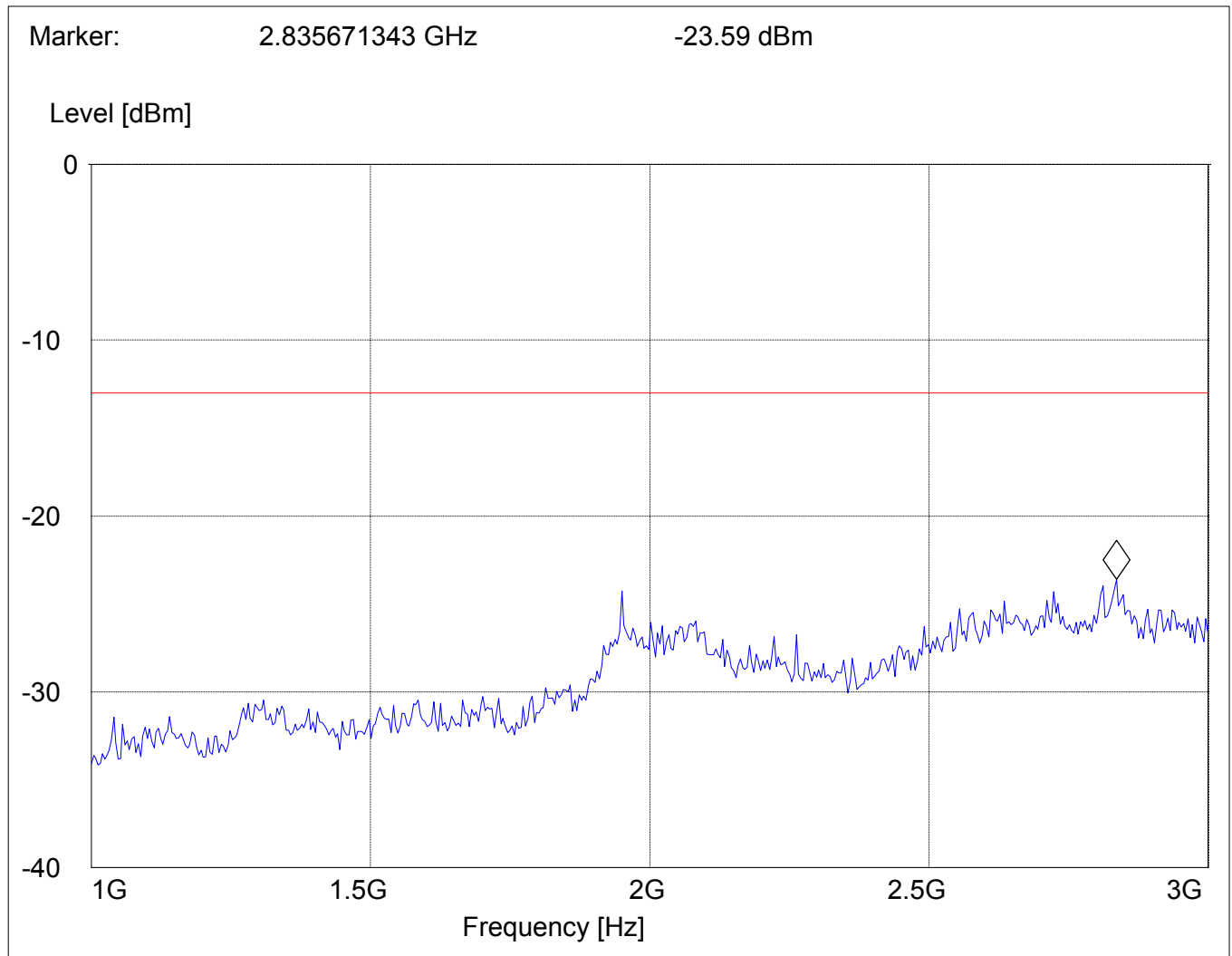
RADIATED SPURIOUS EMISSIONS

EUT in Idle Mode: 1GHz – 3GHz

Spurious emission limit –13dBm

SWEEP TABLE: "FCC Spuri 1-8G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW/VBW
1GHz	8GHz	Max Peak	Coupled	1 MHz

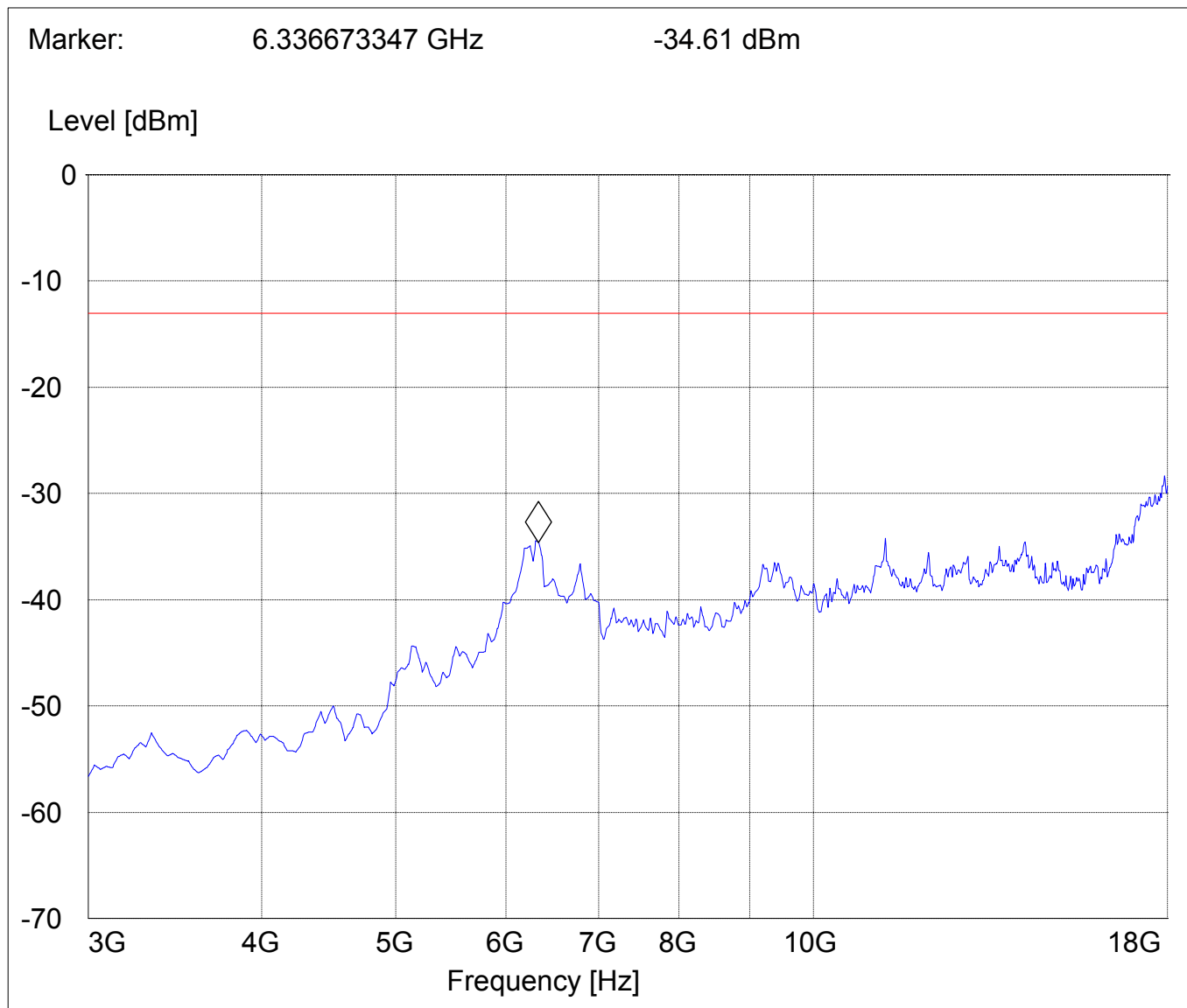


RADIATED SPURIOUS EMISSIONS**EUT in Idle Mode: 3GHz – 18GHz**

Spurious emission limit -13dBm

SWEEP TABLE: "FCC 24 spuri 8-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW/VBW
8GHz	18GHz	Max Peak	Coupled	1 MHz

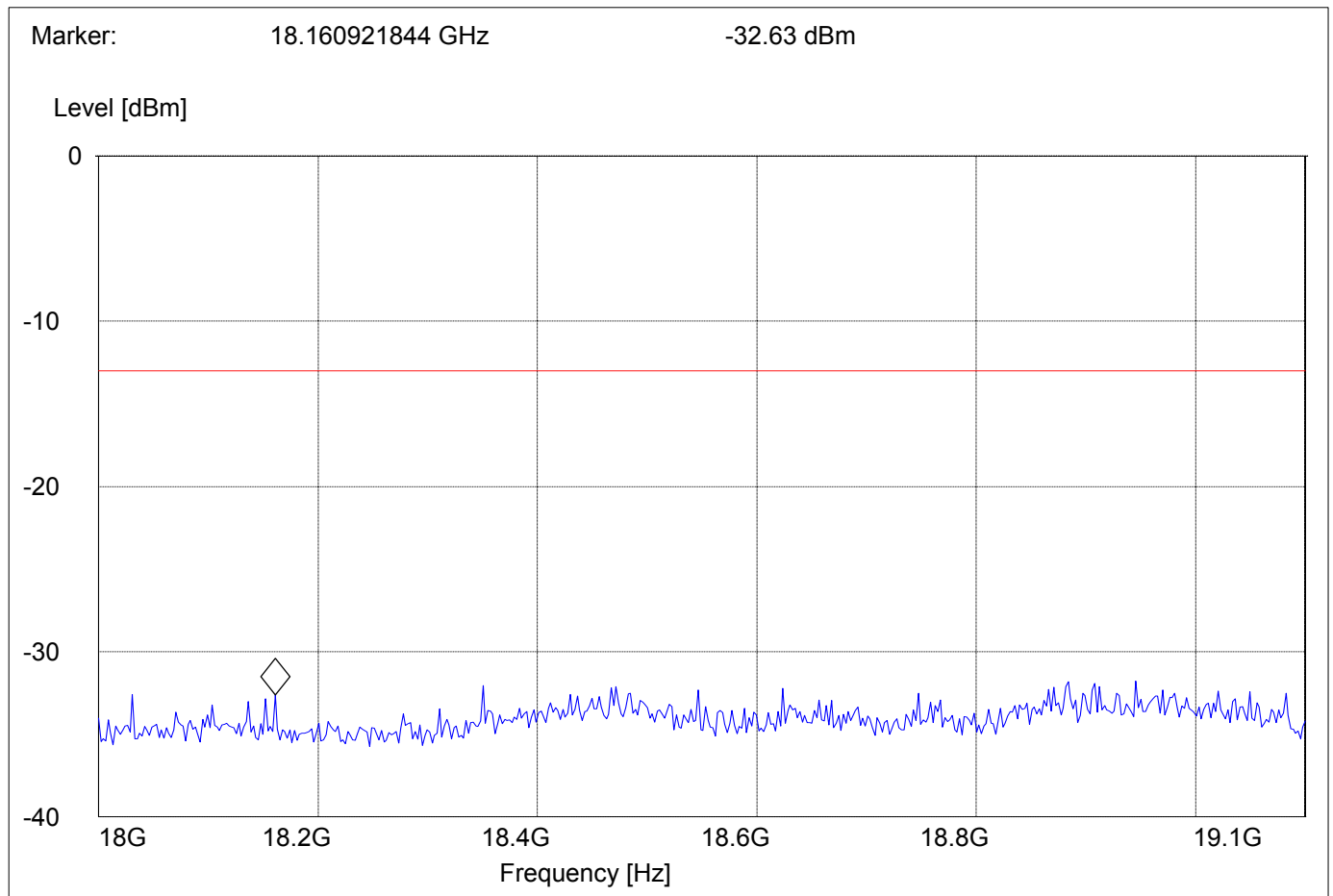


RADIATED SPURIOUS EMISSIONS**EUT in Idle Mode: 18GHz – 19.1GHz**

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



BAND EDGE

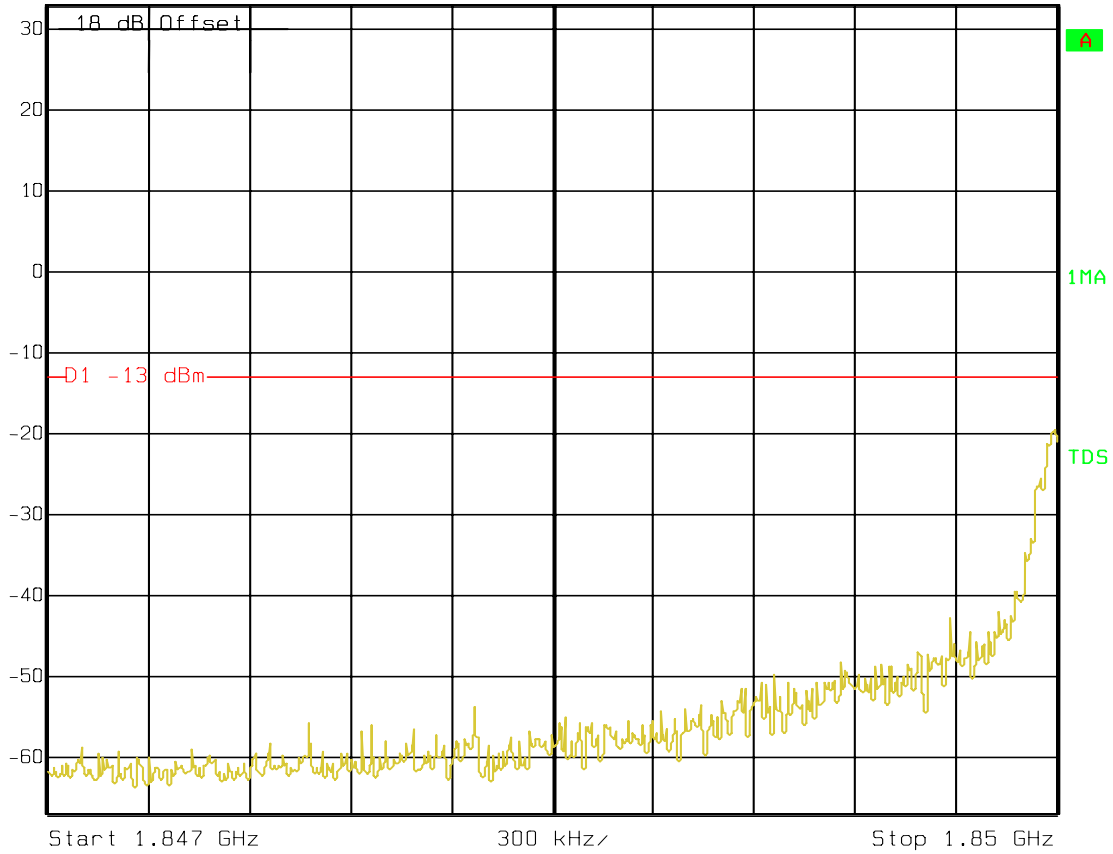
§24.238(b)

Lower Band Edge:
(CONDUCTED)



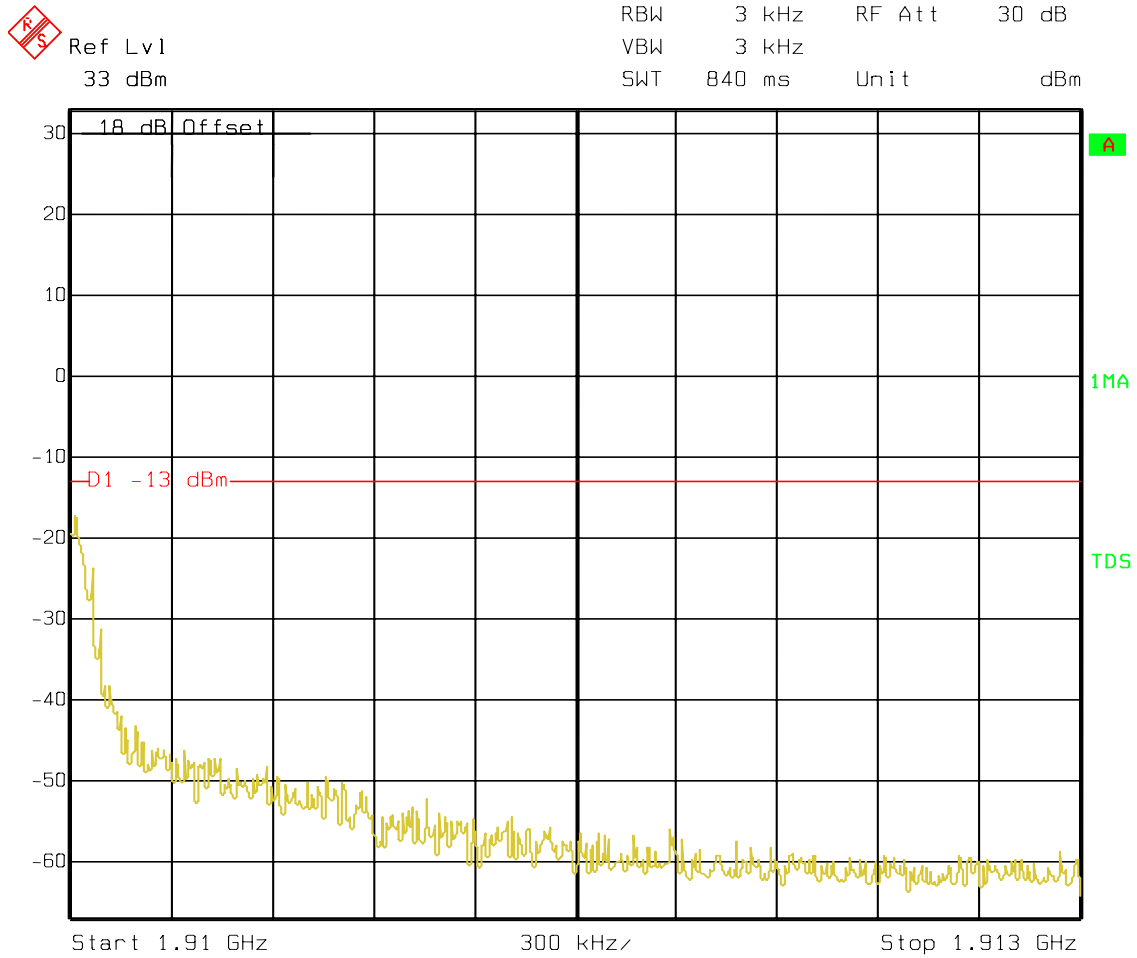
Ref Lvl
33 dBm

RBW 3 kHz RF Att 30 dB
VBW 3 kHz
SWT 840 ms Unit dBm



Date: 8.NOV.01 19:07:00

**Higher Band Edge:
(CONDUCTED)**



Date: 8.NOV.01 19:08:48

RECEIVER RADIATED EMISSIONS**SUBCLAUSE § 15.209**

NOTE: The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. For this reason the graphs show different noise levels.

Limits**SUBCLAUSE § 15.209**

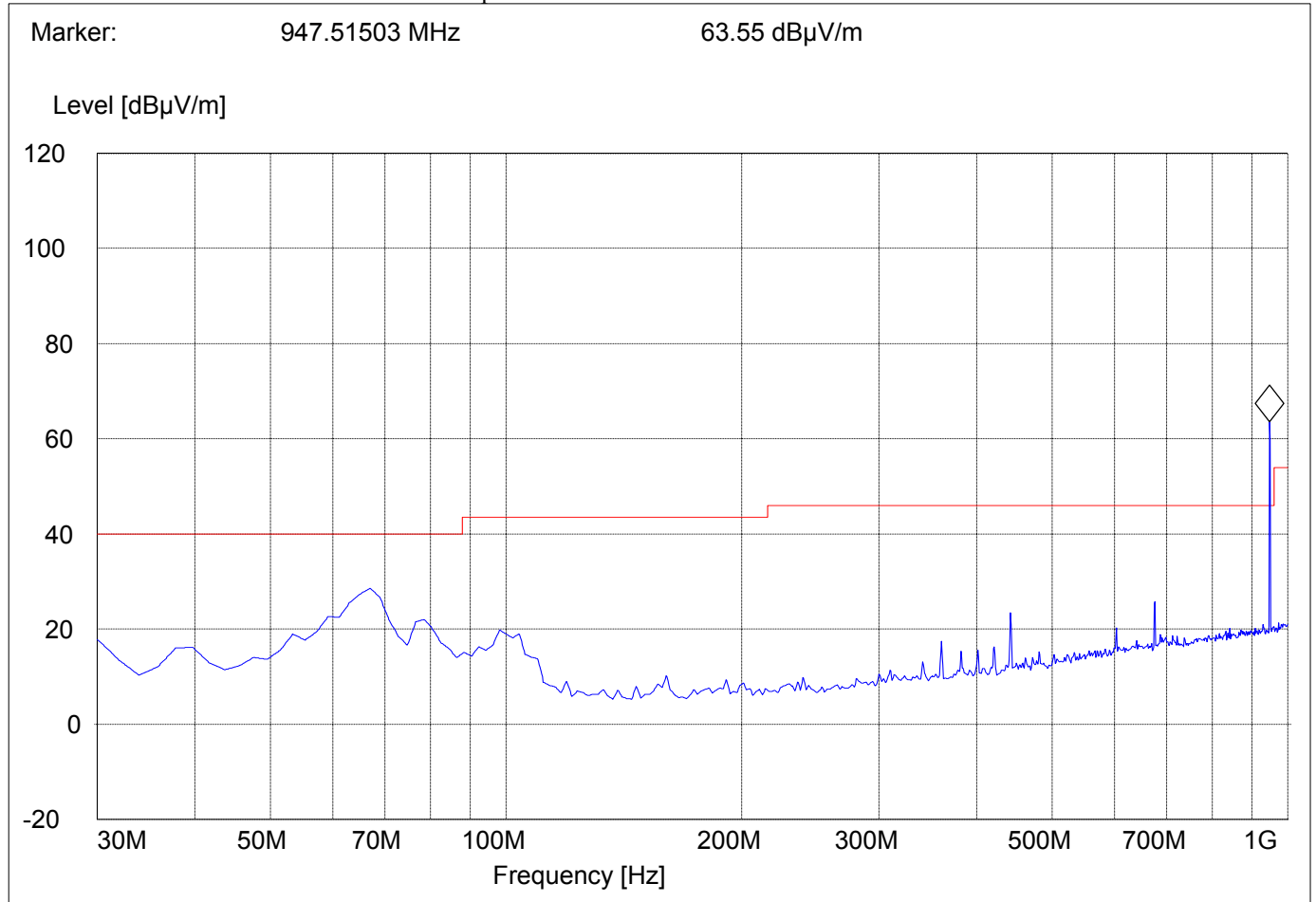
Frequency (MHz)	Field strength ($\mu\text{V}/\text{m}$)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

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

Note: Marked frequency is the downlink of the base station.

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

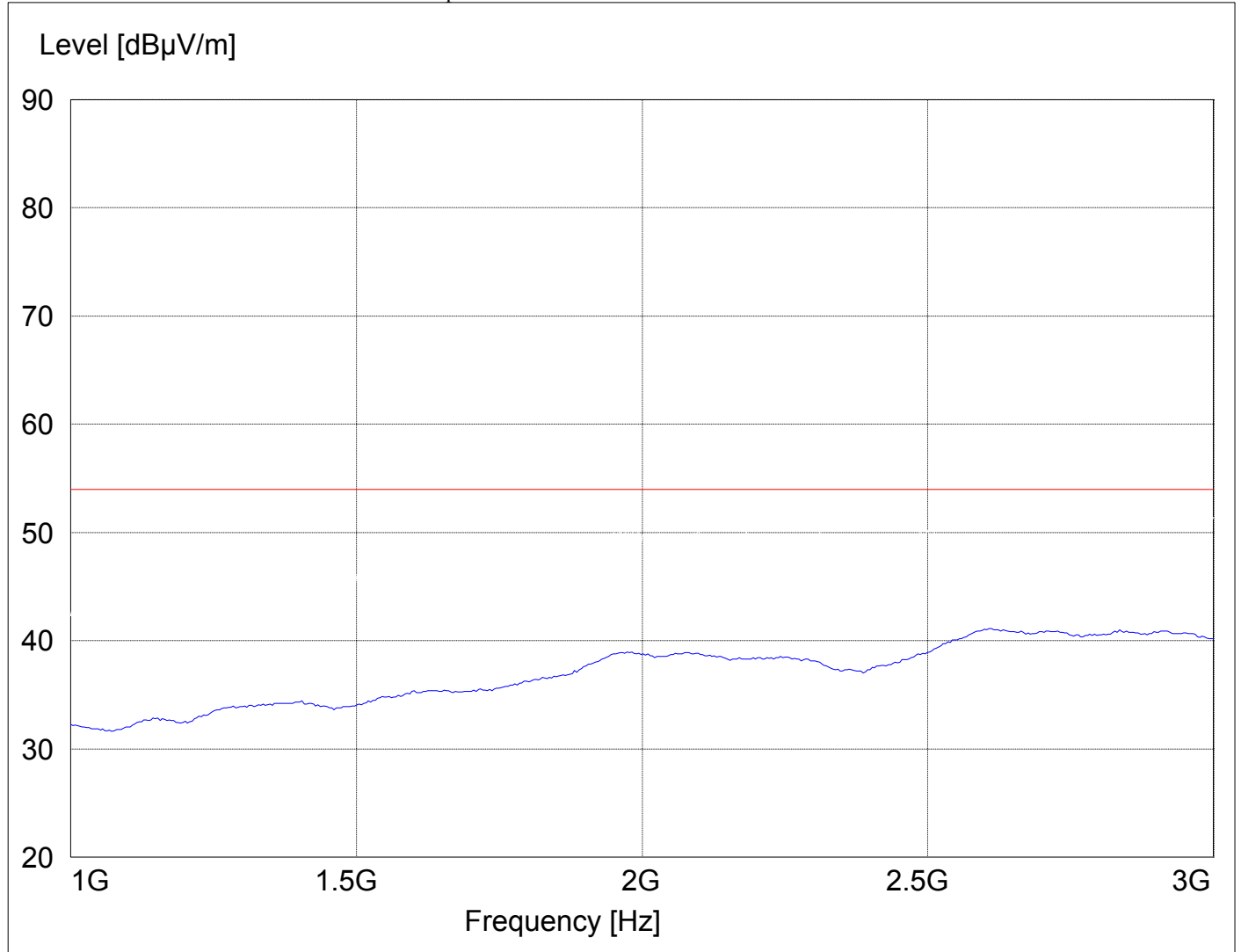
Start	Stop	Detector	Meas. Time	RBW/VBW
30MHz	1GHz	Max Peak	Coupled	100KHz



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

SWEEP TABLE: "FCC Spuri 1-8G"

<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	8GHz	Max Peak	Coupled	1 MHz



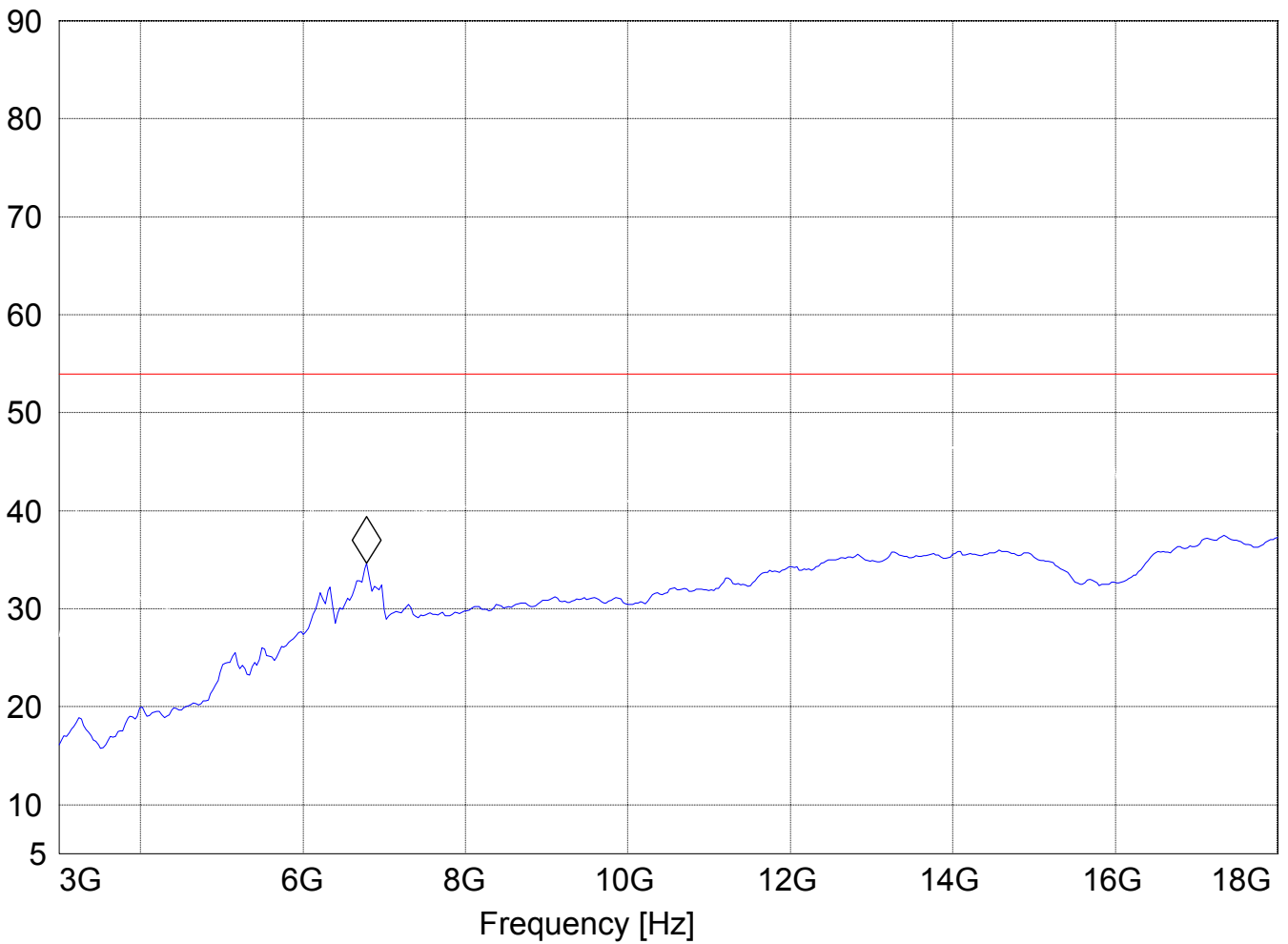
RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 3GHz – 18GHz

SWEEP TABLE: "FCC 24 spuri 8-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW/VBW
8GHz	18GHz	Max Peak	Coupled	1 MHz

Marker: 6.78757515 GHz 34.61 dB μ V/m

Level [dB μ V/m]



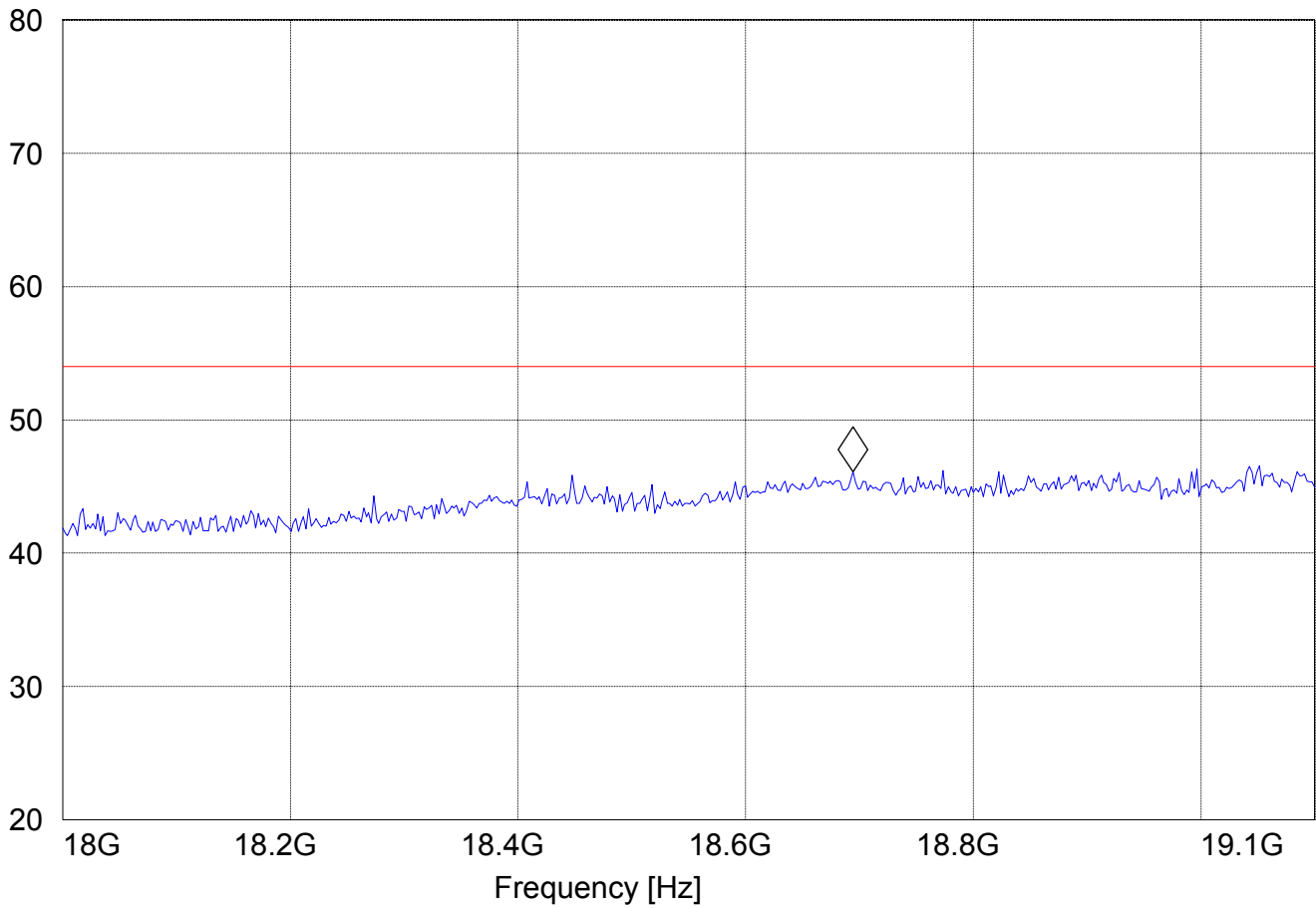
RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 18GHz – 19.1GHz

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

Marker: 18.694388778 GHz 46.1 dB μ V/m

Level [dB μ V/m]



CONDUCTED SPURIOUS EMISSIONS

Measurement Procedure:

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment under test, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

USPCS Transmitter

Channel	Frequency
512	1850.2 MHz
661	1880.0 MHz
810	1909.8 MHz

Measurement Limit:

Sec. 24.238 Emission Limits.

- (a) On any frequency outside frequency band of 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. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

Harmonic	Tx 1850.2 Freq.(MHz)	Level (dBm)	Tx 1880.0 Freq. (MHz)	Level (dBm)	Tx 1909.8 Freq. (MHz)	Level (dBm)
2	3700.4	nf	3760	nf	3819.6	nf
3	5550.6	nf	5640	nf	5729.4	nf
4	7400.8	nf	7520	nf	7639.2	nf
5	9251	nf	9400	nf	9549	nf
6	11101.2	nf	11280	nf	11458.8	nf
7	12951.4	nf	13160	nf	13368.6	nf
8	14801.6	nf	15040	nf	15278.4	nf
9	16651.8	nf	16920	nf	17188.2	nf
10	18502	nf	18800	nf	19098	nf

NOTE: nf=noise floor

CONDUCTED SPURIOUS EMISSIONS

Channel 512: 30MHz-1GHz

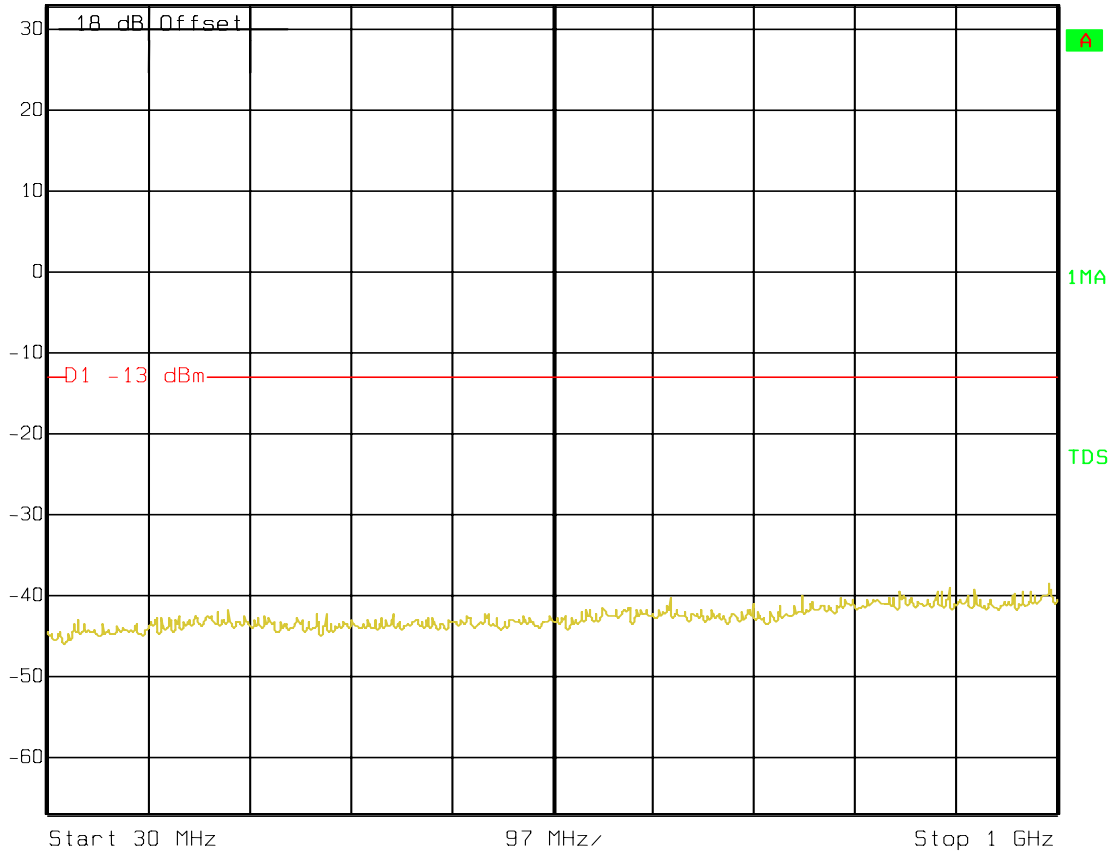
30MHz – 1GHz

Spurious emission limit –13dBm



Ref Lvl
33 dBm

RBW 100 kHz RF Att 30 dB
VBW 100 kHz
SWT 245 ms Unit dBm



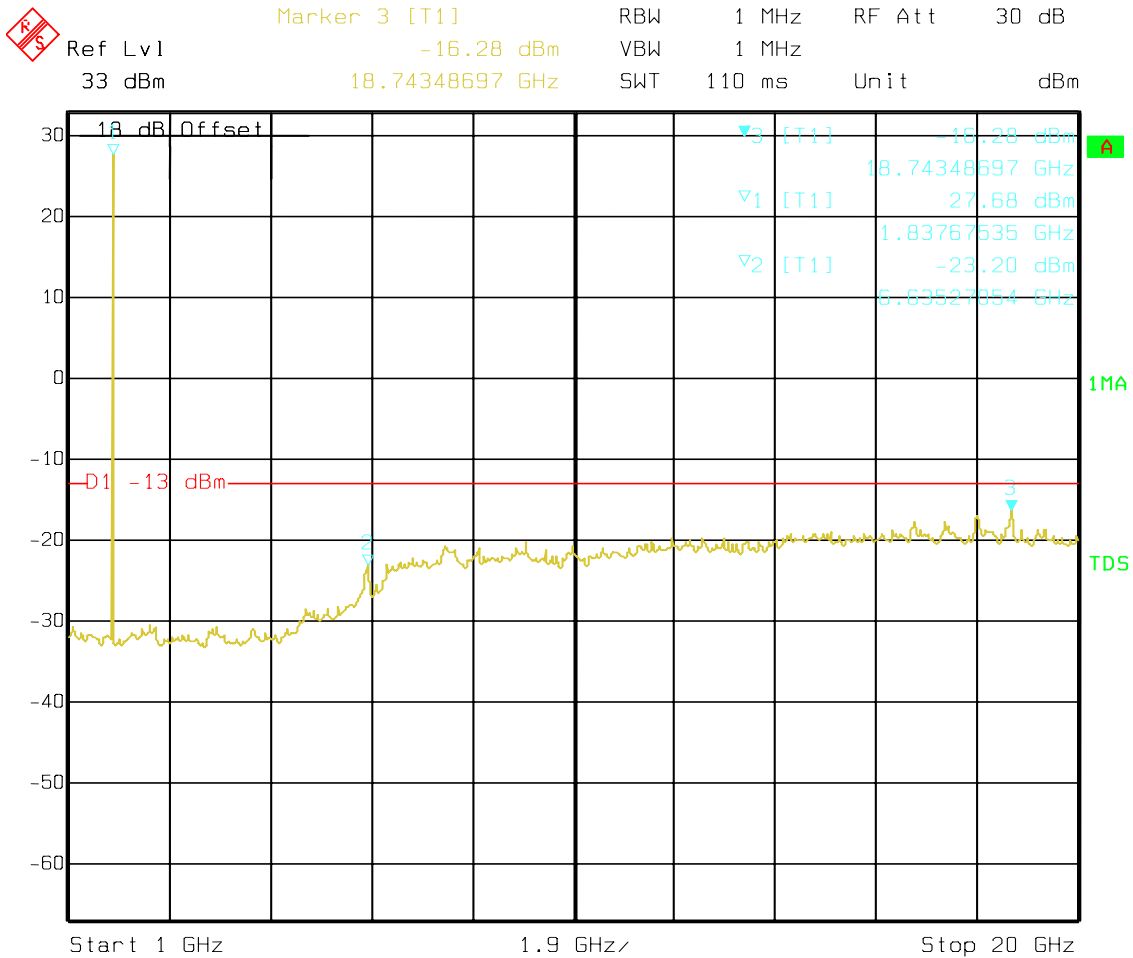
Date: 8.NOV.01 18:47:27

CONDUCTED SPURIOUS EMISSIONS

Channel 512:1GHz – 20GHz

Spurious emission limit –13dBm

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



Date: 8.NOV.01 18:49:45

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

CONDUCTED SPURIOUS EMISSIONS

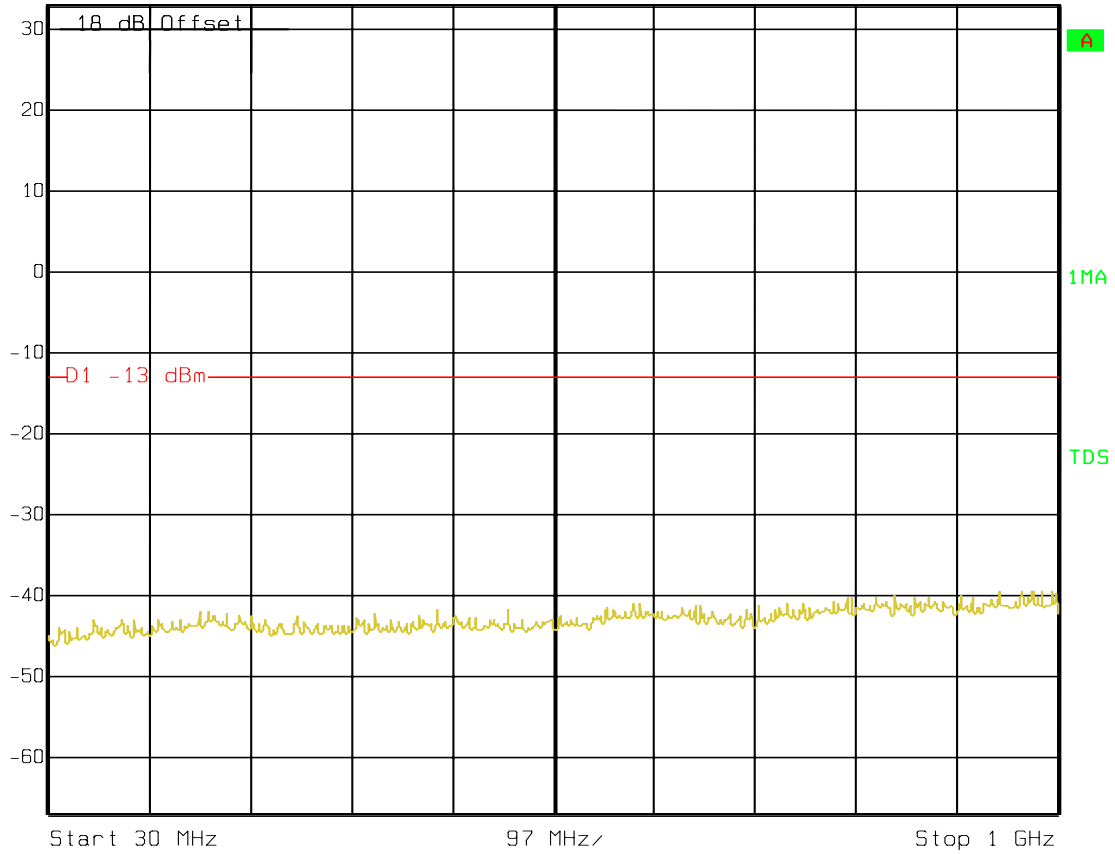
Channel 661: 30MHz-1GHz

Spurious emission limit -13dBm



Ref Lvl
33 dBm

RBW 100 kHz RF Att 30 dB
VBW 100 kHz
SWT 245 ms Unit dBm



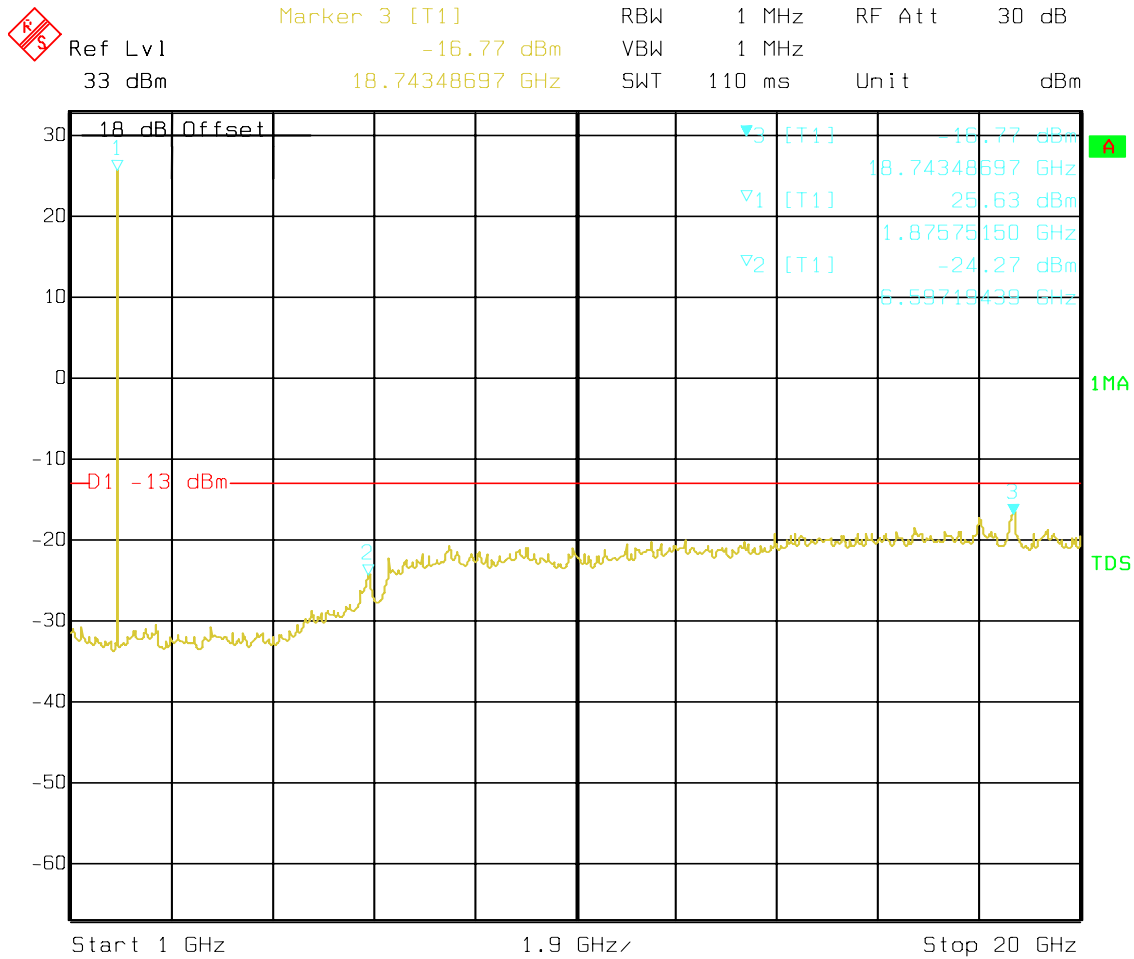
Date: 8.NOV.01 18:51:30

CONDUCTED SPURIOUS EMISSIONS

Channel 661: 1GHz-20GHz

Spurious emission limit -13dBm

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



Date: 8.NOV.01 18:53:22

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

CONDUCTED SPURIOUS EMISSIONS

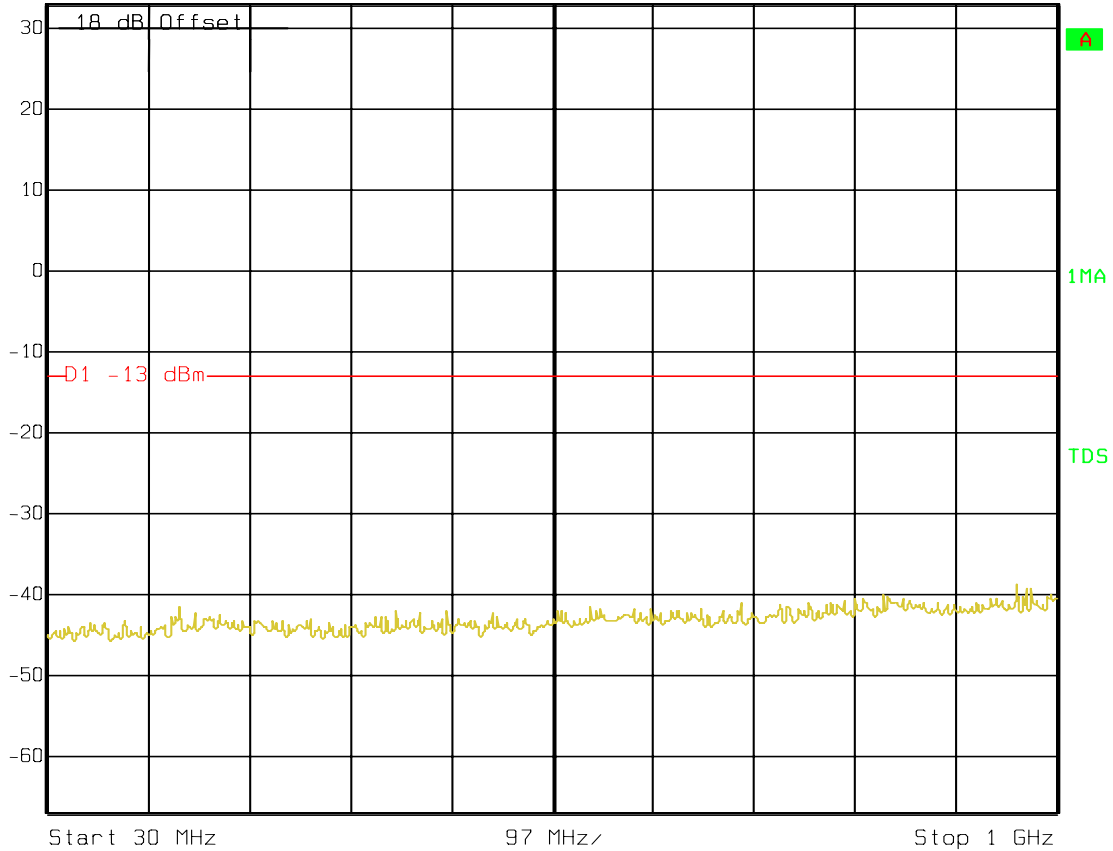
Channel 810: 30MHz-1GHz

Spurious emission limit -13dBm



Ref Lvl
33 dBm

RBW 100 kHz RF Att 30 dB
VBW 100 kHz
SWT 245 ms Unit dBm



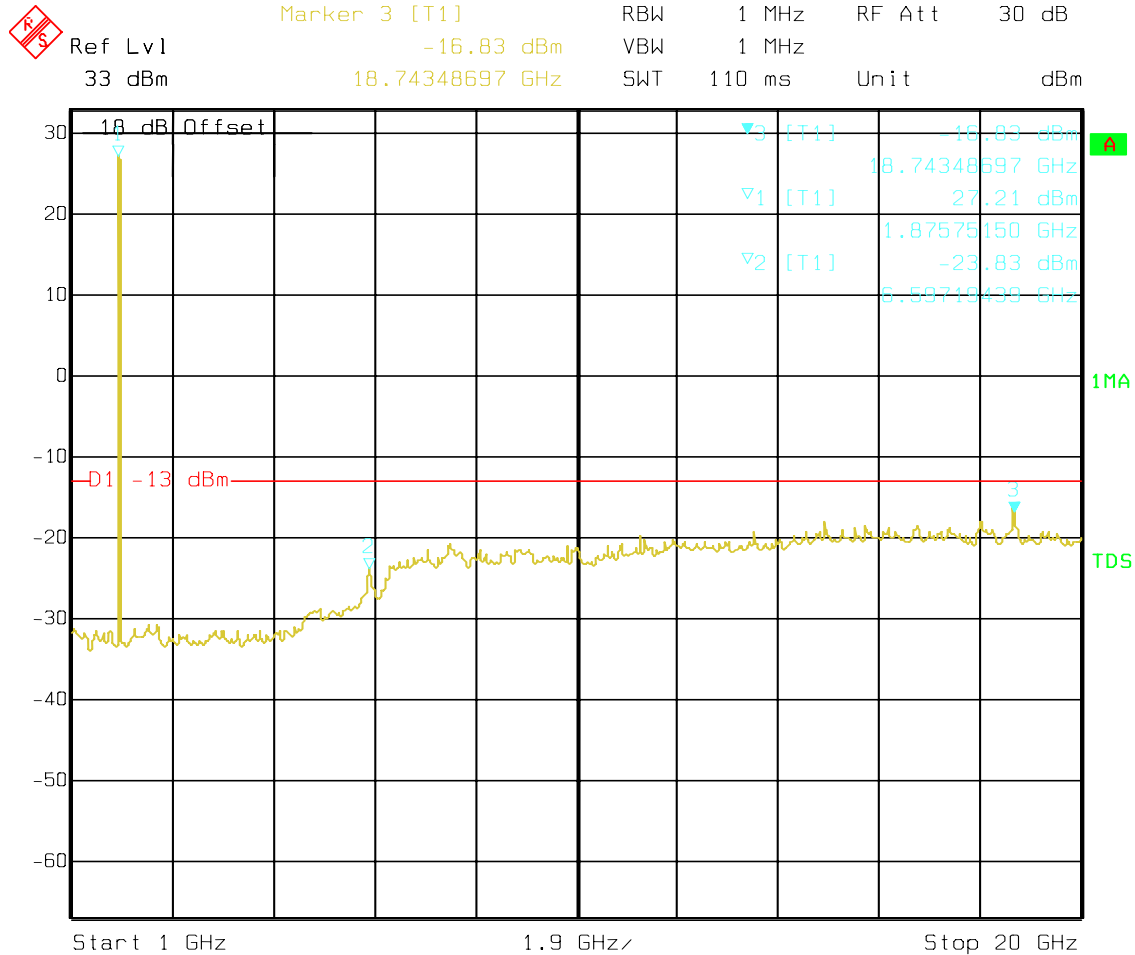
Date: 8.NOV.01 18:59:03

CONDUCTED SPURIOUS EMISSIONS

Channel 810:1GHz – 20GHz

Spurious emission limit –13dBm

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



Date: 8.NOV.01 19:00:38

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

CONDUCTED SPURIOUS EMISSIONS

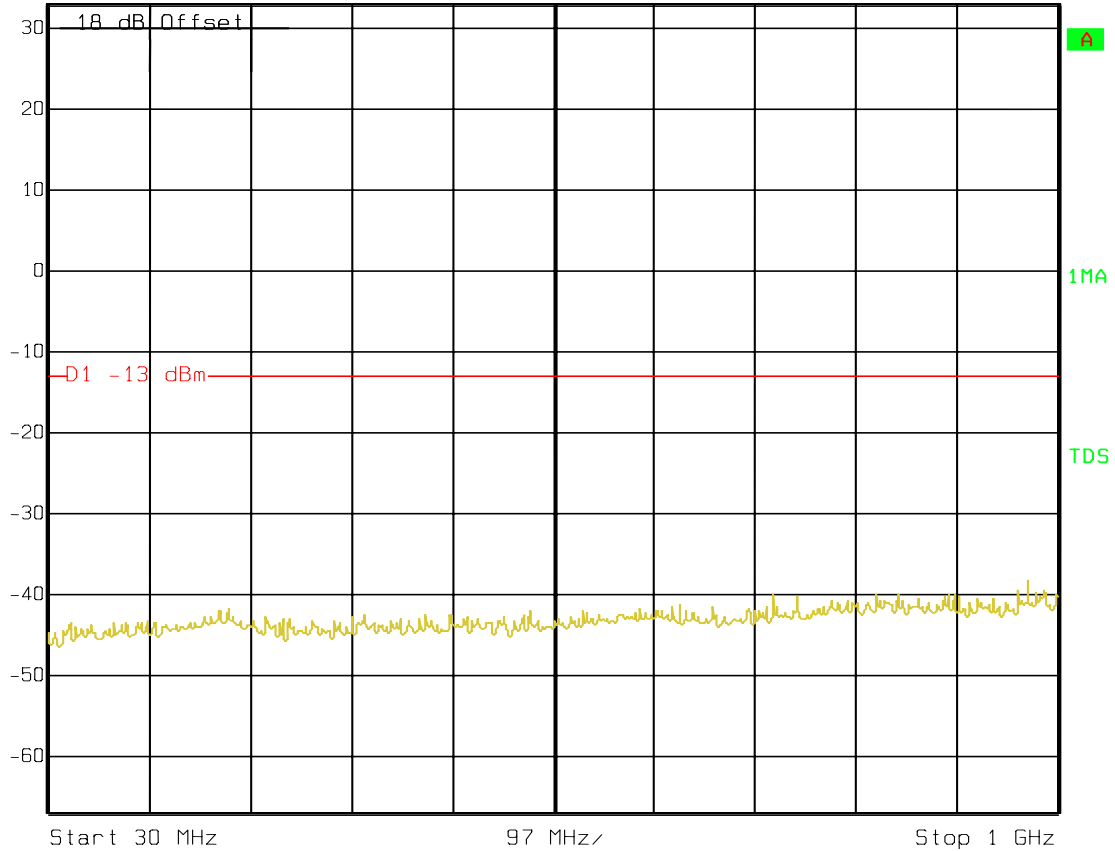
EUT in Idle Mode: 30MHz – 1GHz

Spurious emission limit -13dBm



Ref Lvl
33 dBm

RBW 100 kHz RF Att 30 dB
VBW 100 kHz
SWT 245 ms Unit dBm



Date: 8.NOV.01 19:02:17

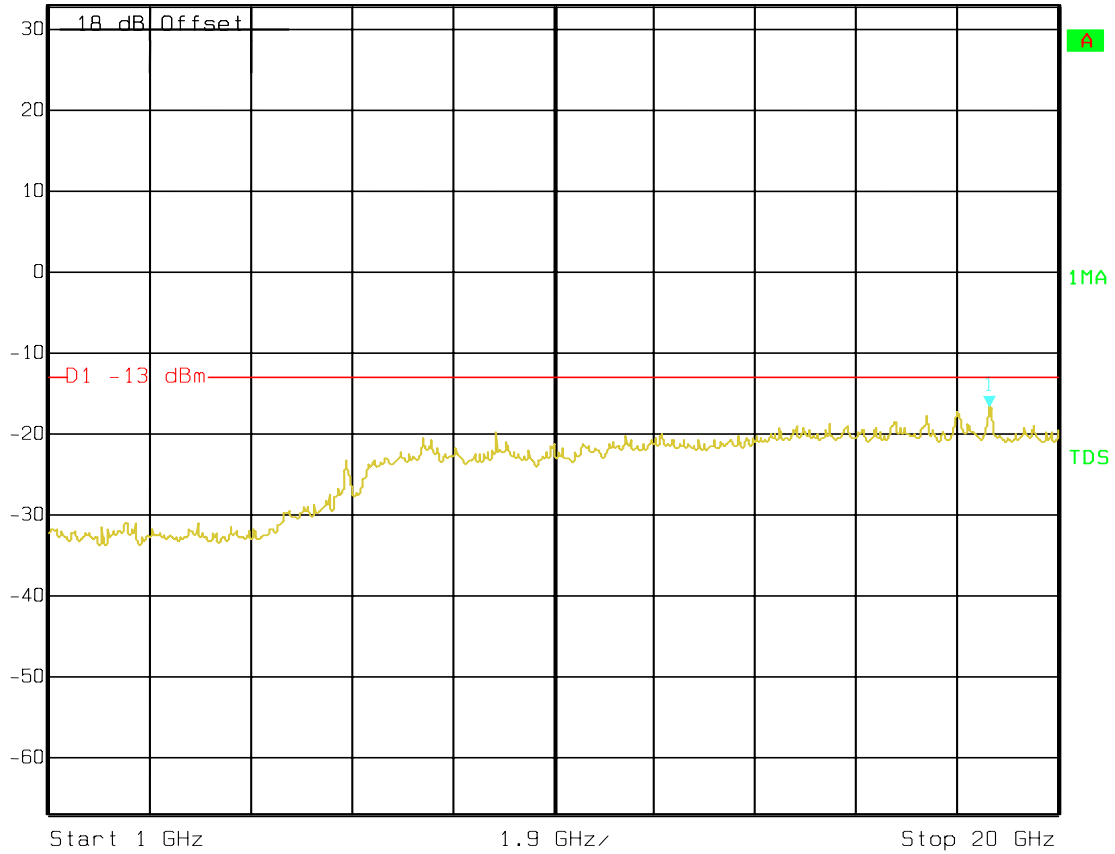
CONDUCTED SPURIOUS EMISSIONS

EUT in Idle Mode: 1GHz – 20GHz

Spurious emission limit -13dBm



Ref Lvl 33 dBm
Marker 1 [T1] 18.70541082 GHz -16.70 dBm
RBW 1 MHz RF Att 30 dB
VBW 1 MHz
SWT 110 ms Unit dBm



Date: 8.NOV.01 19:03:51

CONDUCTED EMISSIONS

§ 15.107/207

Measured with AC/DC power adapter plugged in LISN

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

Limit

Frequency of Emission (MHz)	Conducted Limit (dB μ 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

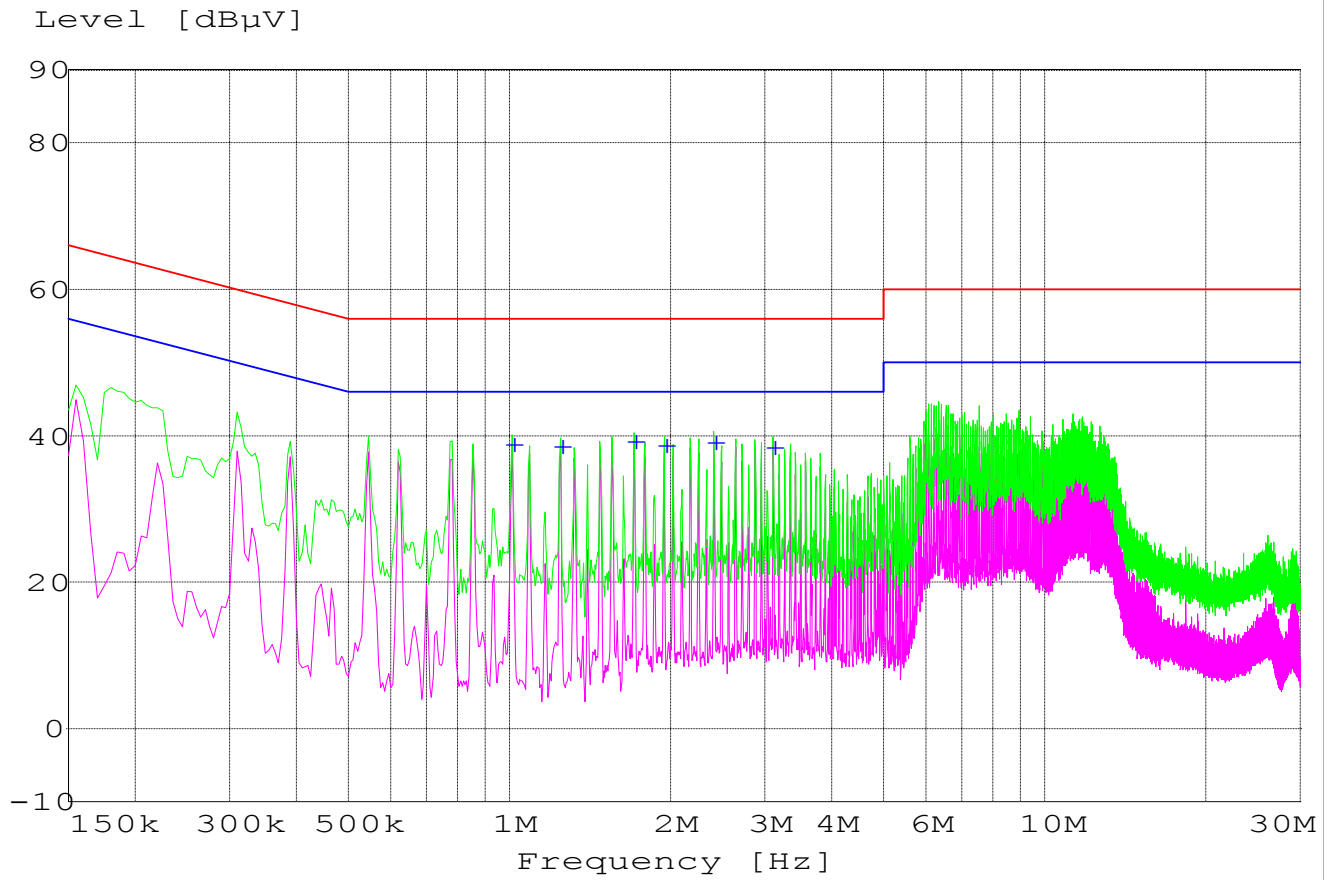
ANALYZER SETTINGS: RBW = 10KHz

VBW = 10KHz

MEASUREMENT RESULT: "test_fin AV"

3/18/03 3:26PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
1.010000	38.80	0.0	46	7.2	N	GND
1.245000	38.50	0.0	46	7.5	L1	GND
1.710000	39.20	0.0	46	6.8	L1	GND
1.945000	38.60	0.0	46	7.4	N	GND
2.410000	39.00	0.0	46	7.0	N	GND
3.110000	38.40	0.0	46	7.6	L1	GND

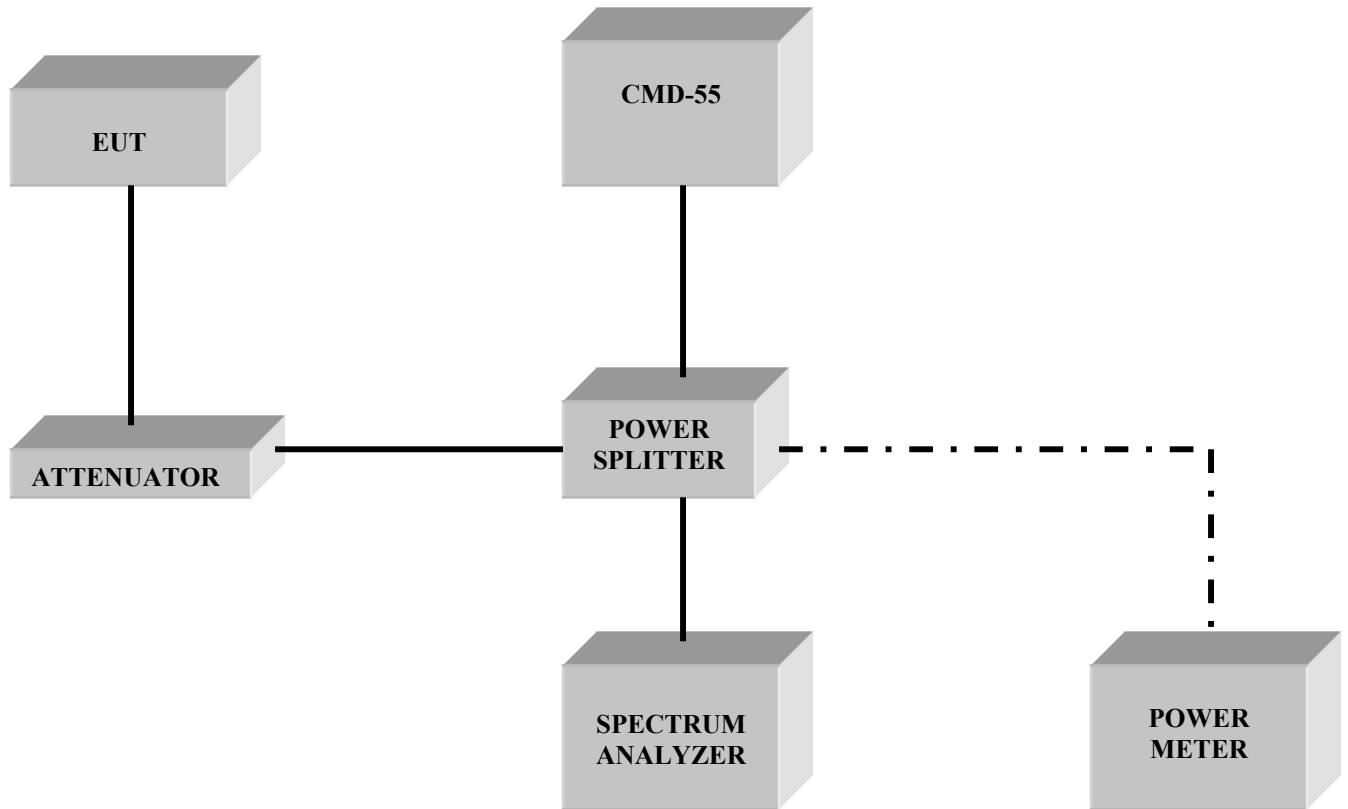


+	+	MES	test_fin	AV	
—		MES	test_pre	PK	
—		MES	test_pre	AV	
—		LIM	EN 55022	V QP	Voltage QP Limit

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	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008

BLOCK DIAGRAMS
Conducted Testing



Radiated Testing

ANECHOIC CHAMBER

