FCC Test Report

FCC Part 22,24 / RSS 132,133

FOR:

DOLPHIN 7900 SERIES

MODEL #: D7900 Series

HANDHELD PRODUCTS, INC.
700 VISIONS DRIVE
SKANEATELES FALLS, NY 13153
U.S.A

FCC ID: Error! Reference source not found.
IC ID: 1693B79LUP

TEST REPORT #: HANDHELD_004_05002_D7900_FCC22/24
DATE: 2006-01-16

Deutscher Akkreditierungs Rat DAR

TTI-P-G 081/94-A0
Accredited according to **ISO/IEC 17025**

Bluetooth™
Bluetooth Qualification Test Facility (BQTF)

CTIA Authorized Testing Laboratory

FCC listed # 101450

IC recognized # 3925

***CETECOM* Inc.**
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CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686
Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

Table of Contents

1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS132 and RSS133.

Company	Description	Model #
HANDHELD PRODUCTS, INC.	**DOLPHIN 7900LUP** **DOLPHIN 7900LU0** **DOLPHIN 7900BUP** **DOLPHIN 7900BUP0**	**D7900LUP** **D7900LU0** **D7900BUP** **D7900BUP0**

2006-01-19
Lothar Schmidt
Test Lab Manager

The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. 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.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	EMC
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Responsible Test Lab Manager:	Lothar Schmidt
Responsible Project Leader:	Neelesh Raj
Date of test:	2006-01-11 to 2006-01-16

2.2 Identification of the Client

Applicant's Name:	**HandHeld Products, Inc.**
Street Address:	**700 Visions Drive**
City/Zip Code	**Skaneateles Falls, NY 13153**
Country	**USA**
Contact Person:	**Naveen Velagapudi**
Phone No.	**315 685 2931**
Fax:	**315 685 1210**
e-mail:	**naveen.velagapudin@handheld.com**

2.3 Identification of the Manufacturer

Manufacturer's Name:	**HandHeld Products, Inc.**
Manufacturers Address:	**700 Visions Drive**
City/Zip Code	**Skaneateles Falls, NY 13153**
Country	**USA**

3 Equipment under Test (EUT)

3.1 Identification of the Equipment under Test

Marketing Name:	Dolphin 7900LUP
Description:	Dolphin 7900 is a ruggedized handheld computer which can read Barcodes and other Auto ID codes. It contains three different wire less transmitters(Bluetooth, Wireless Lan and GSM/GPRS) to send and receive data.
Model No:	D7900LUP
FCC ID:	**Error! Reference source not found.**
IC ID:	1693B79LUP
Frequency Range:	824.2MHz – 848.8MHz for GSM 850, 1850.2MHz – 1909.8MHz for PCS 1900
Type(s) of Modulation:	GMSK
Number of Channels:	124 for GSM-850, 299 for PCS-1900
Antenna Type:	EXTERNAL FIXED
Output Power:	FCC 22: 0.684W ERP@848.8MHz FCC 24: 1.38W EIRP@1850.2MHz

TYPE	MANF.	MODEL	FCC ID
HOMEBASE	HANDHELD PRODUCTS, INC.	7900-HB	DoC
AC ADAPTER	AULT INC.	41206341-01	n/a
EXTRA BATTERY	HANDHELD PRODUCTS, INC.	--	DoC

This report is related to the GSM transmitters in the following FCC IDs and configurations. The GSM antenna was modified to get better values in the low frequency range. No changes were made to the WLAN transmitters. GSM and WLAN cannot transmit simultaneously therefore no data is shown in this report for WLAN.

FCC ID:	Configuration:
HD57900LUP	Dolphin 7900 with GSM, 802.11b and Bluetooth radios
HD57900LU0	Dolphin 7900 with GSM and 802.11b radios
HD57900BUP	Dolphin 7900 with GSM and Bluetooth radios
HD57900BU0	Dolphin 7900 with GSM radios

4 Subject of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the D7900 referred to as EUT as specified by requirements listed in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS132 and RSS133.

The EUT was tested as a handheld device and in the homebase, worst case results are provided in this report. The EUT was maximized in the X,Y, Z positions , all data in report shows the worst case between horizontal and vertical polarization for above 1GHz.

The EUT carries pre-certified Siemens GSM module model# MC46 with FCC ID: QIPMC46. This test report covers full radiated testing as per FCC 22/24 on EUT with GSM module. All conducted measurements for GSM 1900 are covered under *test report# 2-205420436/02* and for GSM850 are covered under *test report# 2_3350-01-01/03.*

5 Measurements

5.1 Radiated Power

5.1.1 FCC 2.1046 Measurements required: RF power output.

Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

5.1.2 Limits:

5.1.2.1 FCC 22.913 (a) Effective radiated power limits.

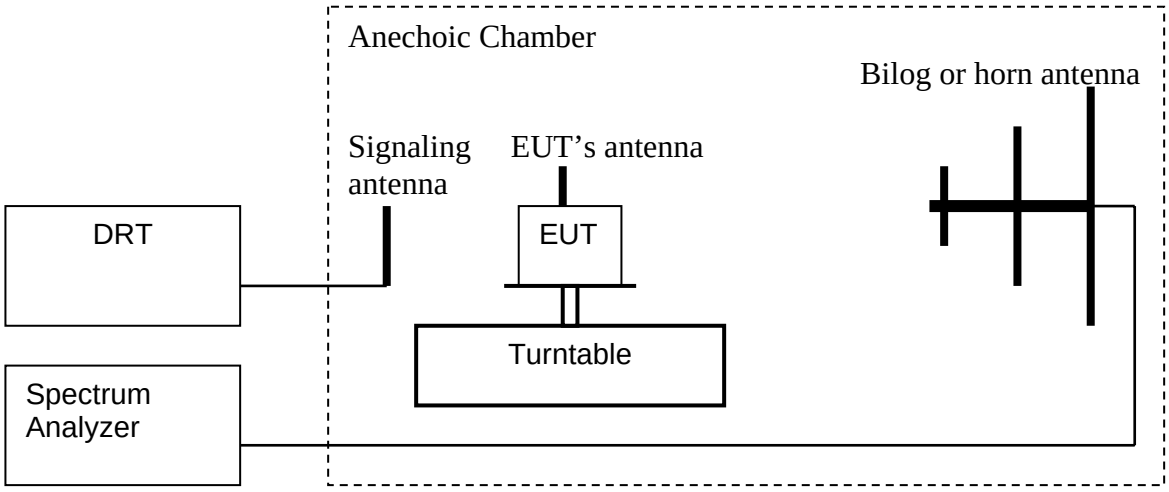
The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

5.1.2.2 FCC 24.232 (b)(c) Power limits.

(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).
(c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

5.1.3 Radiated Output Power Measurement procedure:

Based on TIA-603B November 2002
2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a vertical orientation.

2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:
   ERP (dBm) = **LVL** (dBm) + **LOSS** (dB)
8. Determine the EIRP using the following equation:
   EIRP (dBm) = **ERP** (dBm) + 2.14 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band. **Spectrum analyzer settings = rbw=vbw=3MHz**

(**note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4, 7 and 8 above are performed with test software.)

5.1.4 ERP Results 850 MHz band:

Power Control Level	Burst Peak ERP
5	≤38.45dBm (7W)

Frequency (MHz)	Effective Radiated Power (dBm)
824.2	26.18
836.6	27.25
848.8	28.35

5.1.5 EIRP Results 1900 MHz band:

Power Control Level	Burst Peak EIRP
0	≤33dBm (2W)

Frequency (MHz)	Effective Isotropic Radiated Power (dBm)
1850.2	31.41
1880.0	31.13
1909.8	31.34

*all measurments were performed in the antenna lab

EIRP (GSM-850) **§22.913(a)**

Total	Frequency (MHz)	824.2	836.6	848.8
	Point Values			
	Ant. Port Input Pwr. (dBm)	30	30	30
	Tot. Rad. Pwr. (dBm)	24.3281	25.3983	26.5165
	Peak EIRP (dBm)	28.3213	29.3953	30.4852
	Directivity (dBi)	3.99326	3.99702	3.96874
	Efficiency (dB)	-5.67193	-4.60174	-3.4835
	Gain (dBi)	-1.67867	-0.604723	0.485242
	NHPRP ±Pi/4 (dBm)	23.1284	24.1466	25.2161
	NHPRP ±Pi/6 (dBm)	21.4543	22.4032	23.4152
	NHPRP ±Pi/8 (dBm)	20.1336	21.0376	22.0142
	Front/Back Ratio (dB)	9.66593	9.78996	9.21131
	Phi BW (°)	156	147	144
	+ Phi BW (°)	91	89	87
	- Phi BW (°)	65	58	57
	Theta BW (°)	60	61	62
	+ Th. BW (°)	29	33	34
	- Th. BW (°)	31	28	28
	Boresight Phi (°)	225	210	210
	Boresight Th. (°)	120	120	120
	Maximum Power (dBm)	28.3213	29.3953	30.4852
	Minimum Power (dBm)	10.8792	12.4503	14.6309
	Average Power (dBm)	23.411	24.5258	25.6862
	Max/Min Ratio (dB)	17.4421	16.9449	15.8544
	Max/Avg Ratio (dB)	4.91035	4.86952	4.79906
	Min/Avg Ratio (dB)	-12.5317	-12.0754	-11.0553
	Average Gain (dB)	-5.67193	-4.60174	-3.4835

EIRP (PCS-1900) **§24.232(b)**

Total	Frequency (MHz)	1850.2	1880	1909.8
	Point Values			
	Ant. Port Input Pwr. (dBm)	30	30	30
	Tot. Rad. Pwr. (dBm)	25.93	25.7252	26.0681
	Peak EIRP (dBm)	31.4109	31.1321	31.3435
	Directivity (dBi)	5.48094	5.40694	5.27546
	Efficiency (dB)	-4.07004	-4.2748	-3.93195
	Gain (dBi)	1.4109	1.13213	1.34351
	NHPRP ±Pi/4 (dBm)	23.8734	23.6602	24.0186
	NHPRP ±Pi/6 (dBm)	22.2738	22.057	22.4314
	NHPRP ±Pi/8 (dBm)	21.3299	21.13	21.523
	Front/Back Ratio (dB)	7.42284	7.12082	7.3652
	Phi BW (°)	96	92	91
	+ Phi BW (°)	48	51	51
	- Phi BW (°)	48	41	40
	Theta BW (°)	41	44	42
	+ Th. BW (°)	19	20	18
	- Th. BW (°)	22	24	24
	Boresight Phi (°)	270	300	300
	Boresight Th. (°)	165	165	165
	Maximum Power (dBm)	31.4109	31.1321	31.3435
	Minimum Power (dBm)	19.1998	18.5995	18.2636
	Average Power (dBm)	26.462	26.306	26.503
	Max/Min Ratio (dB)	12.2111	12.5326	13.0799
	Max/Avg Ratio (dB)	4.94891	4.82615	4.84049
	Min/Avg Ratio (dB)	-7.26218	-7.70644	-8.23945
	Average Gain (dB)	-4.07004	-4.2748	-3.93195

5.2 Spurious Emissions Radiated

5.2.1 FCC 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

5.2.2 Limits:

5.2.2.1 FCC 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(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.

5.2.2.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(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.

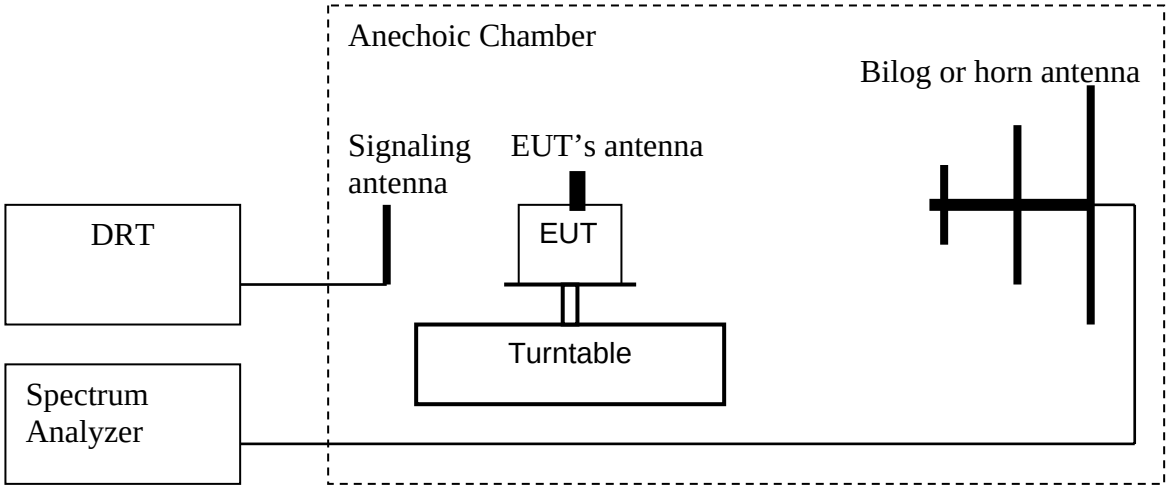
(b) Measurement procedure. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the 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.

5.2.3 Radiated out of band measurement procedure:

Based on TIA-603B November 2002

2.2.12 Unwanted emissions: Radiated Spurious



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS)**. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation: **Spurious** (dBm) = **LVL** (dBm) + **LOSS** (dB):
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation: **Spurious** (dBm) = **LVL** (dBm) + **LOSS** (dB):
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

(**note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

Spectrum analyzer settings:
Res B/W: 1 MHz
Vid B/W: 1 MHz

Measurement Survey:

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the GSM-850 & 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 GSM-850 & 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.

5.2.4 Radiated out of band emissions results on EUT:

RESULTS OF RADIATED TESTS GSM-850:

Harmonics	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)
2	**1648.4**	-39.46	**1673.2**	-36.34	**1697.6**	-36.36
3	**2472.6**	-45.05	**2509.8**	-43.38	**2546.4**	-43.62
4	**3296.8**	-51.33	**3346.4**	-46.49	**3395.2**	-50.65
5	**4121**	-44.01	**4183**	-48.02	**4244**	-43.14
6	**4945.2**	-39.89	**5019.6**	-45.45	**5092.8**	-48.31
7	**5769.4**	-49.09	**5856.2**	-48.21	**5941.6**	NF
8	**6593.6**	NF	**6692.8**	NF	**6790.4**	NF
9	**7417.8**	-47.37	**7529.4**	-46.39	**7639.2**	-46.43
10	**8242**	-46.09	**8366**	-50.47	**8488**	-47.76
NF = NOISE FLOOR						

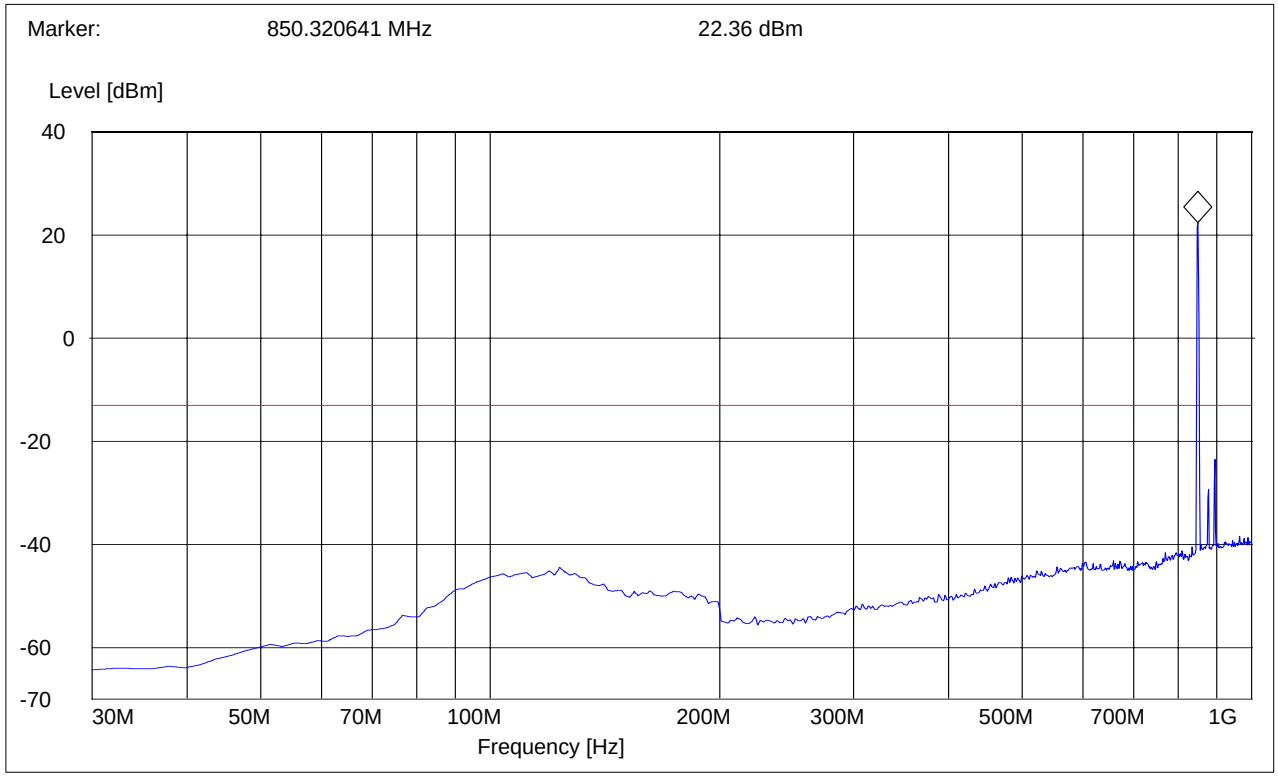
RADIATED SPURIOUS EMISSIONS (GSM-850)
TX: 30MHz - 1GHz
Spurious emission limit –13dBm
Antenna: vertical

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

Note:

1.The peak above the limit line is the carrier freq.
2.This plot is valid for low, mid & high channels (worst-case plot)



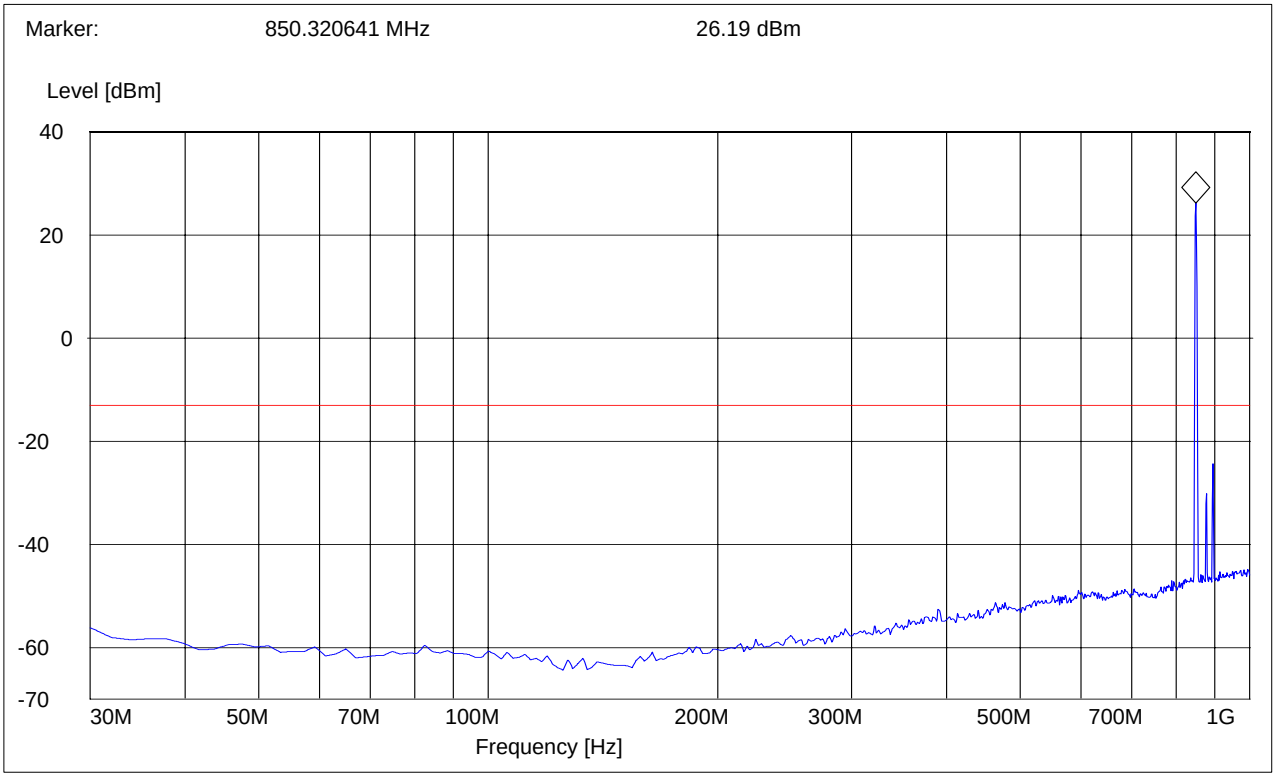
RADIATED SPURIOUS EMISSIONS (GSM-850)
TX: 30MHz - 1GHz
Spurious emission limit –13dBm
Antenna: horizontal

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

Note:

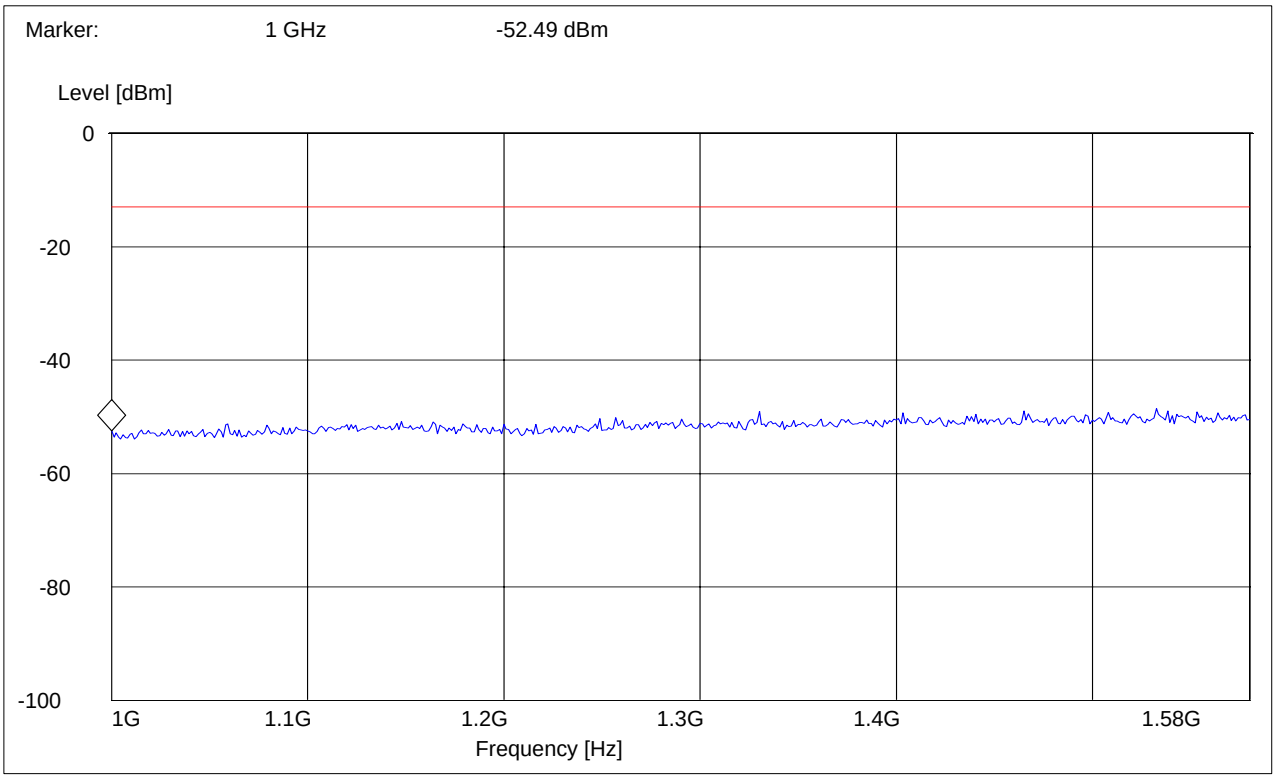
1.The peak above the limit line is the carrier freq.
2.This plot is valid for low, mid & high channels (worst-case plot)



RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 824.2MHz: 1GHz – 1.58GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1-1.58G"

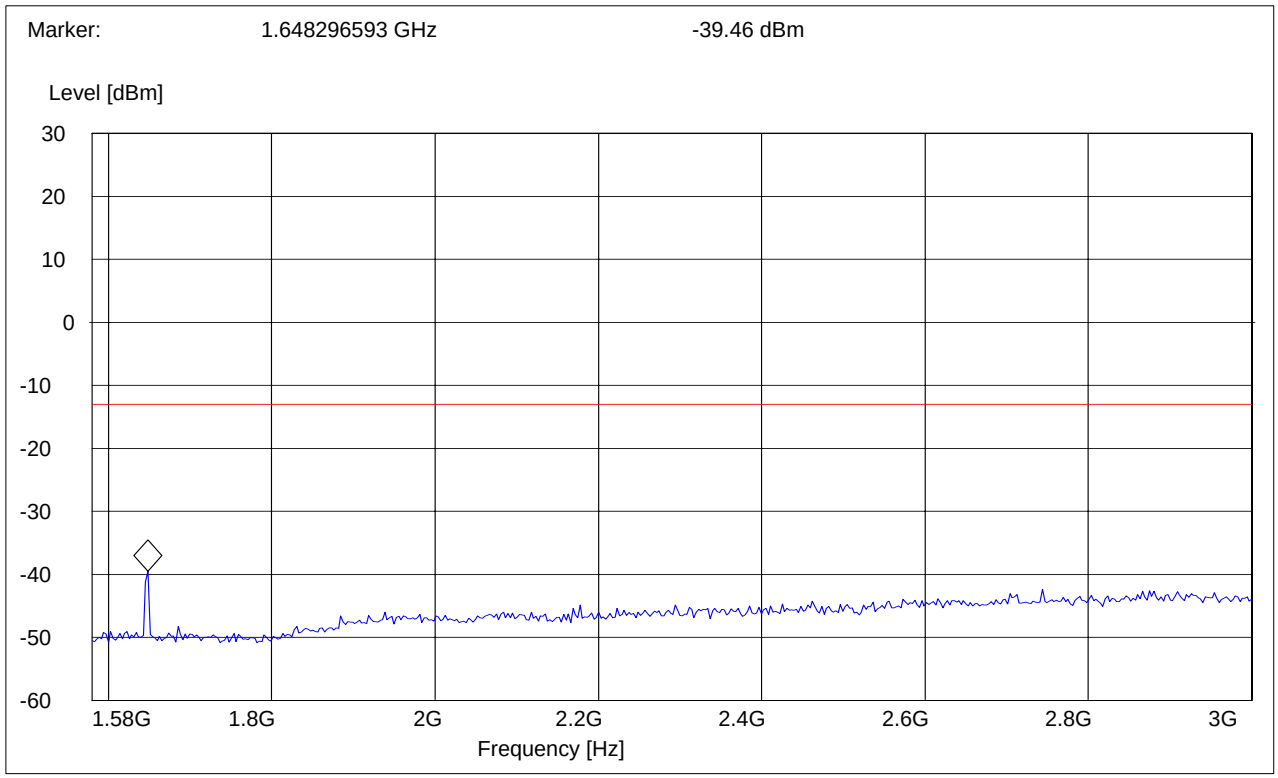
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	1.58GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 824.2MHz: 1.58GHz – 3GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1.58-3G"

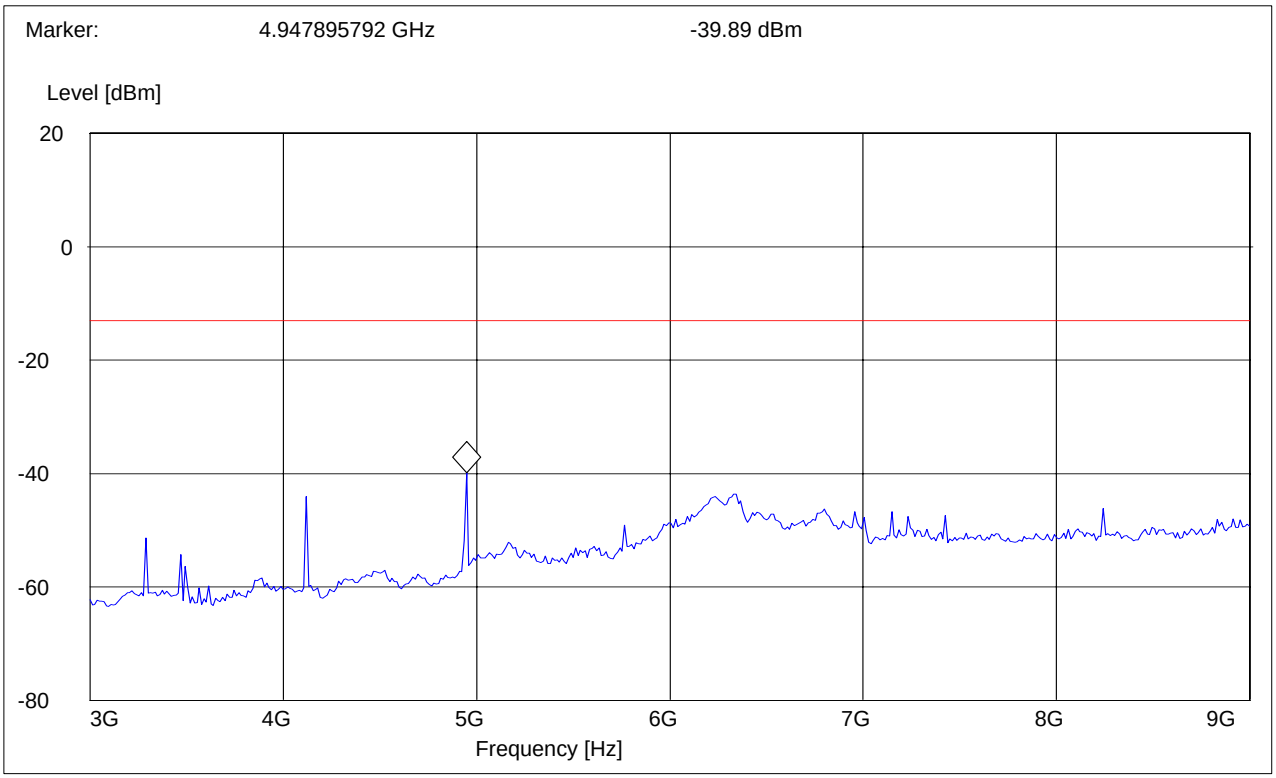
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1.58GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 824.2MHz: 3GHz – 9GHz
Spurious emission limit –13dBm

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

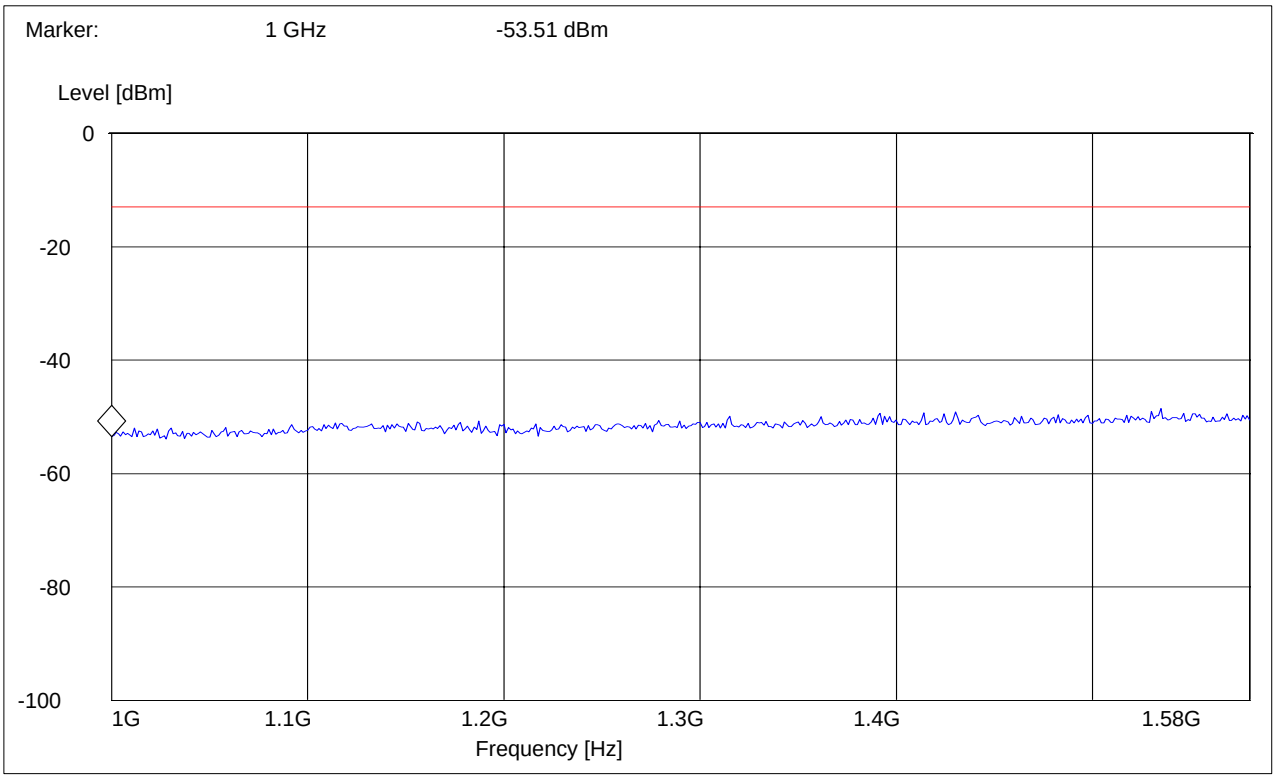
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 836.6MHz: 1GHz – 1.58GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1-1.58G"

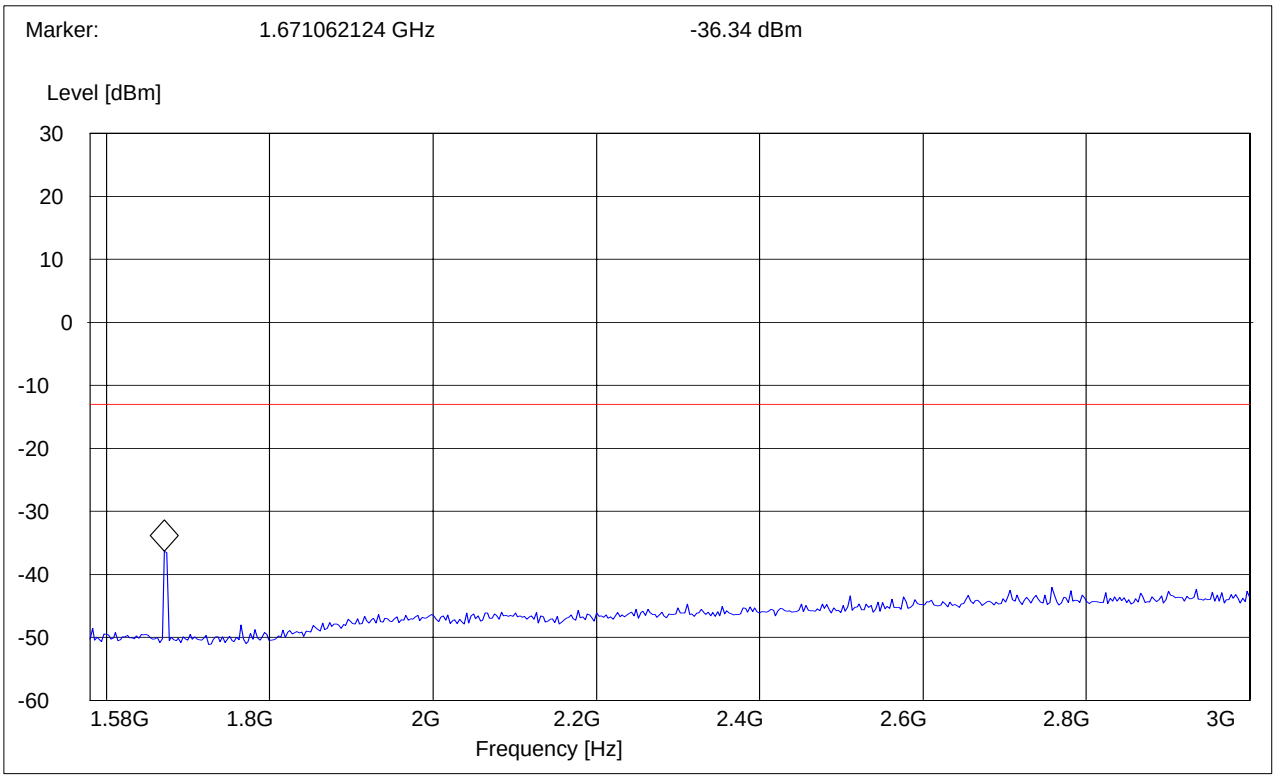
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	1.58GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 836.6MHz: 1.58GHz – 3GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1.58-3G"

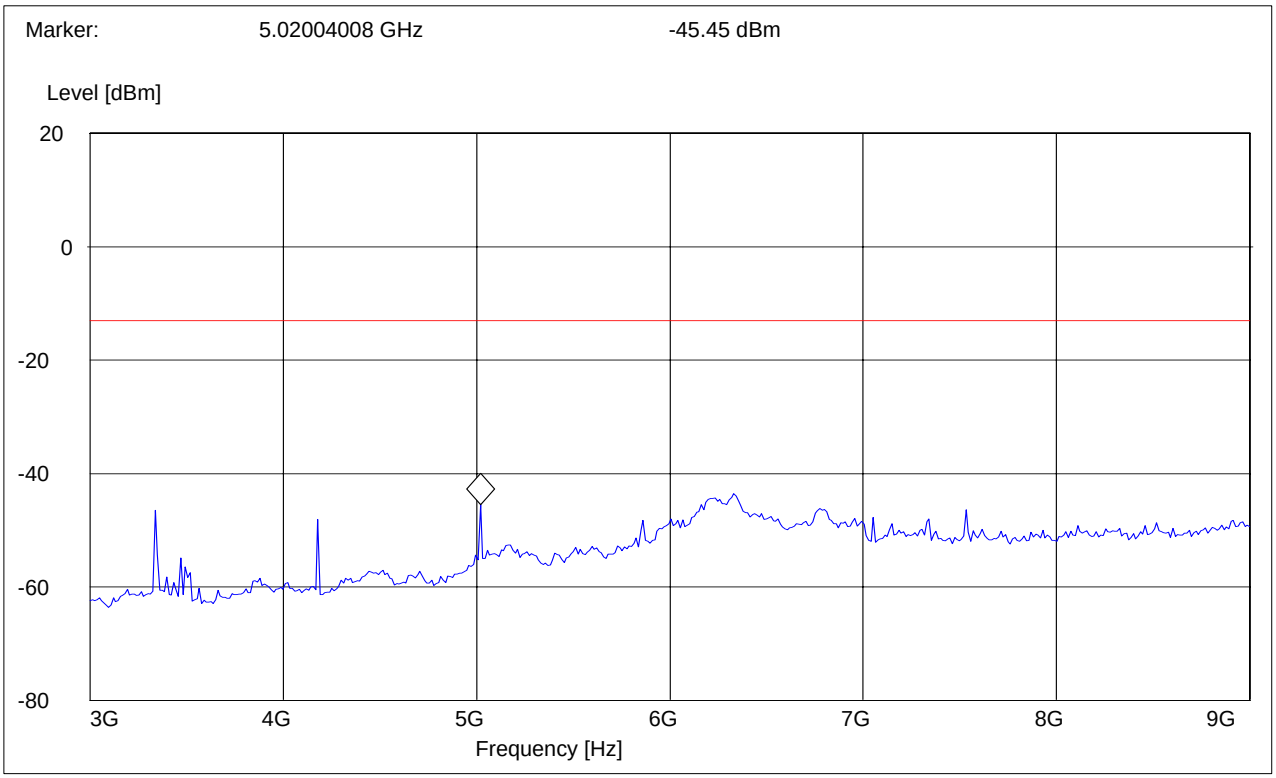
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1.58GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 836.6MHz: 3GHz – 9GHz
Spurious emission limit –13dBm

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

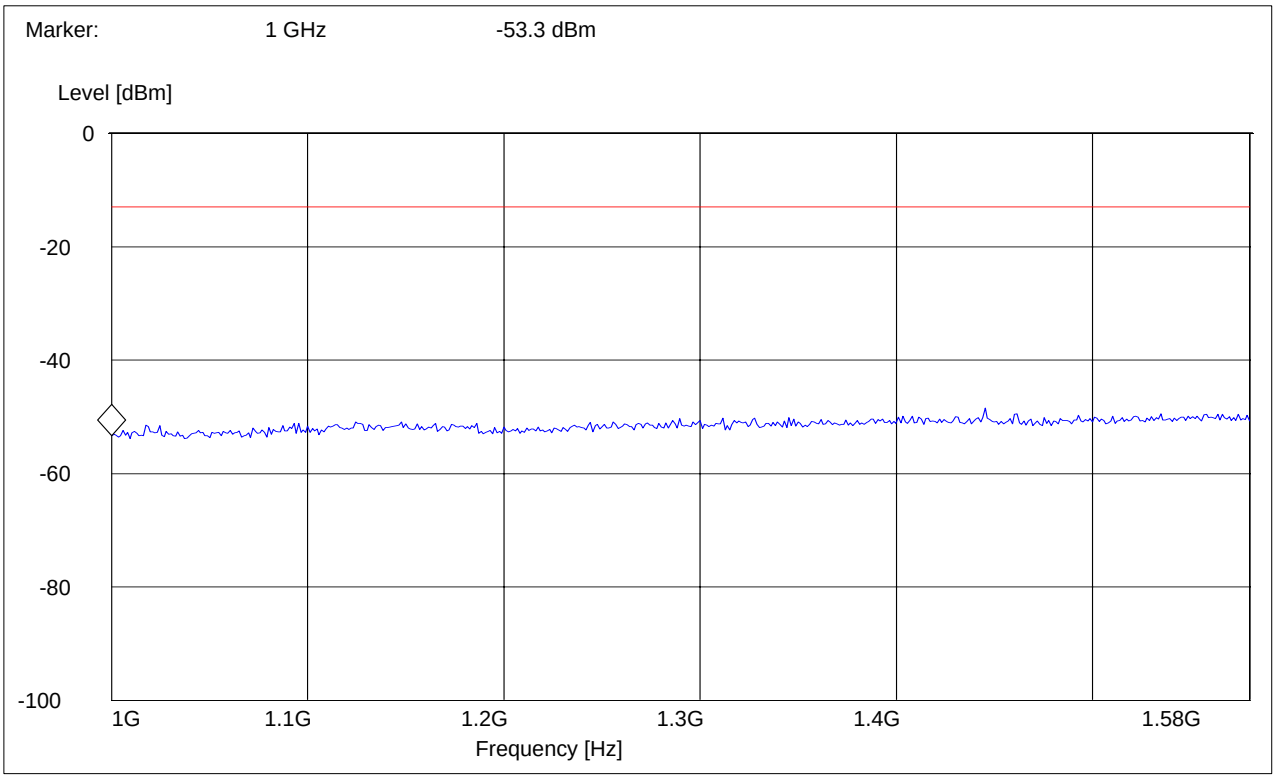
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 848.8MHz: 1GHz – 1.58GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1-1.58G"

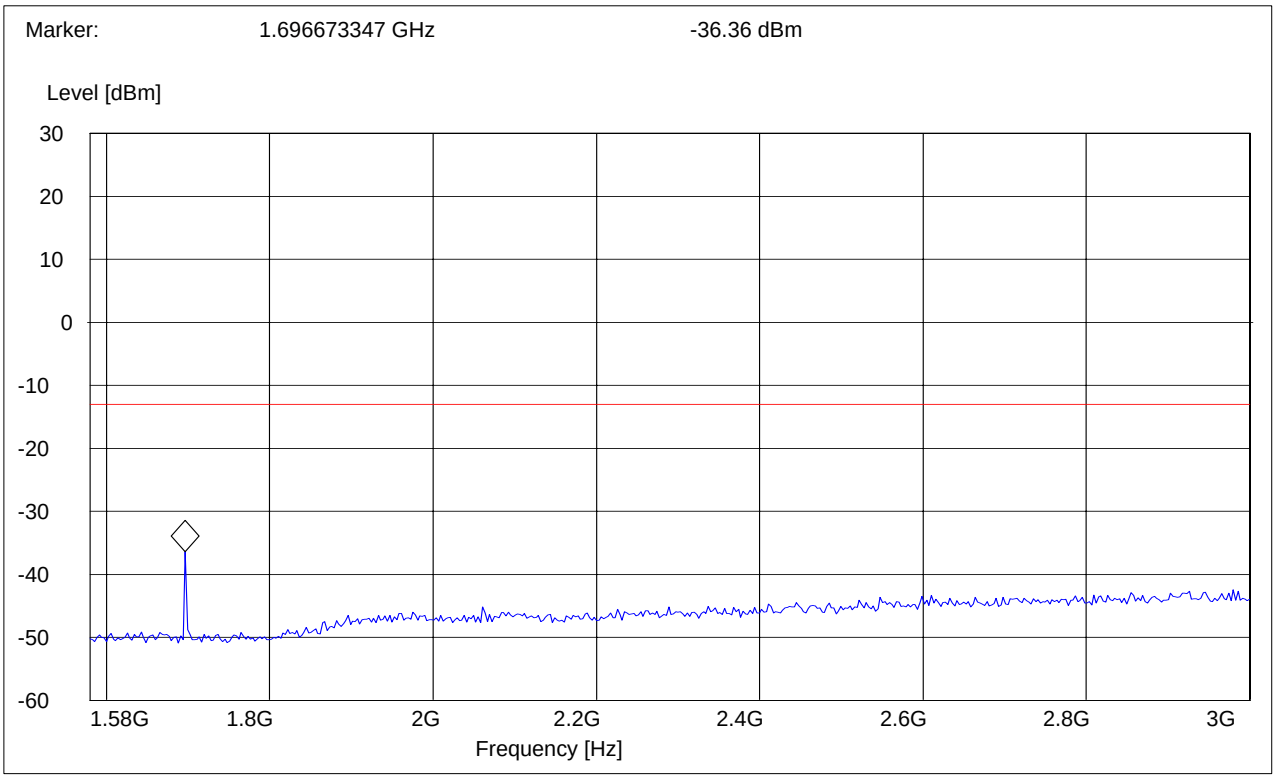
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	1.58GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 848.8MHz: 1.58GHz – 3GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC 22 Spur 1.58-3G"

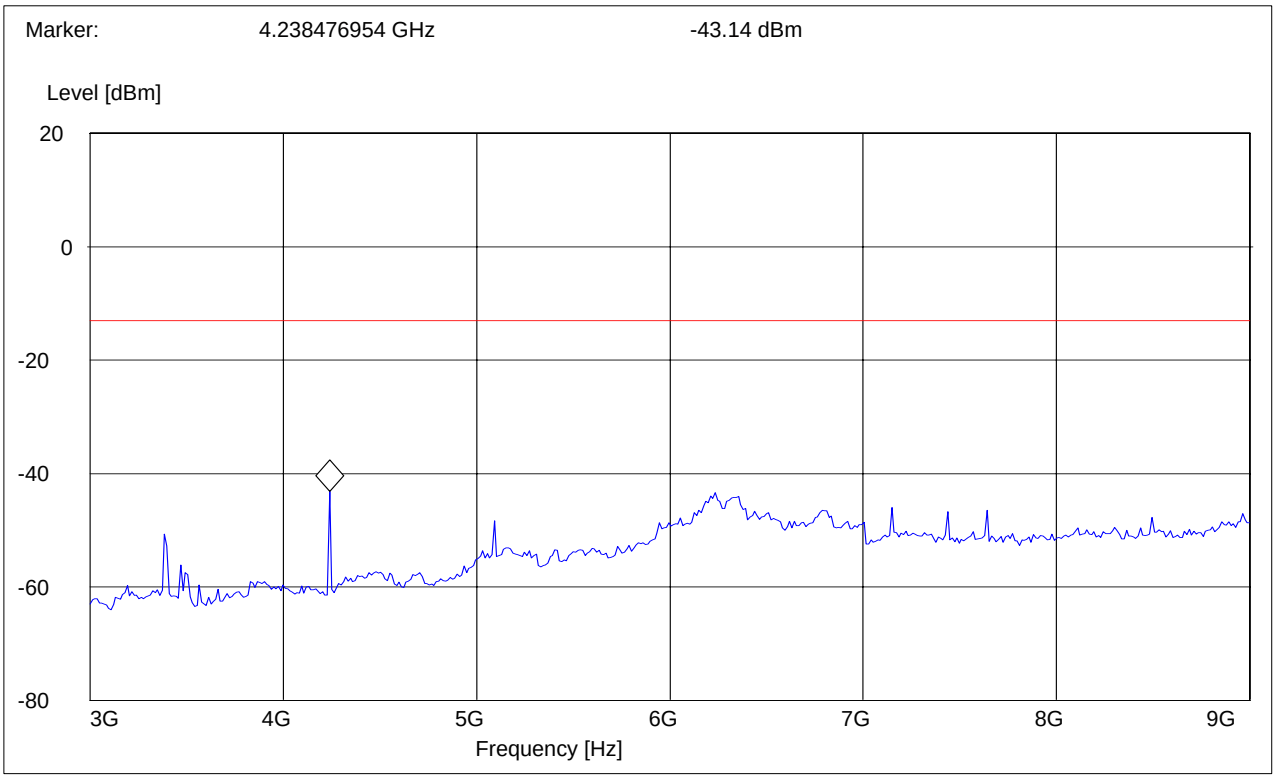
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1.58GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
Tx @ 848.8MHz: 3GHz – 9GHz
Spurious emission limit –13dBm

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

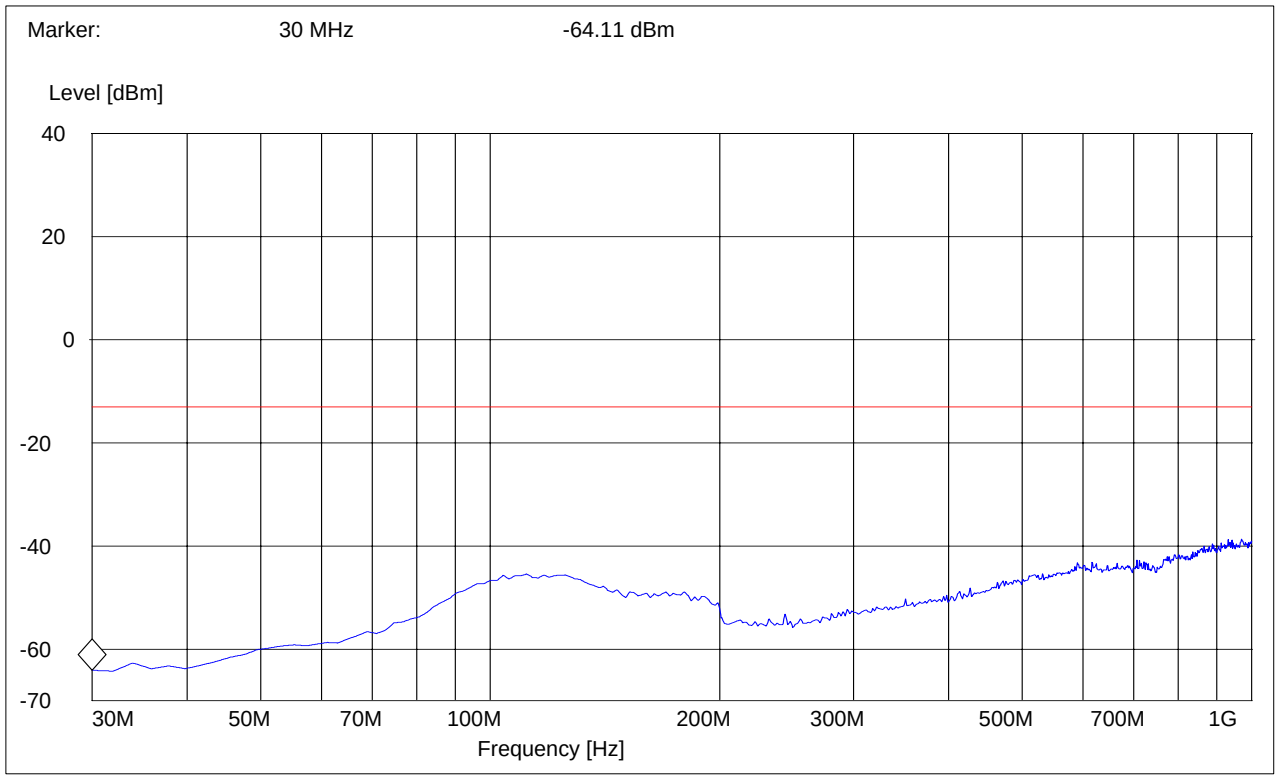
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
IDLE: 30MHz - 1GHz
Spurious emission limit –13dBm
Antenna: vertical

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

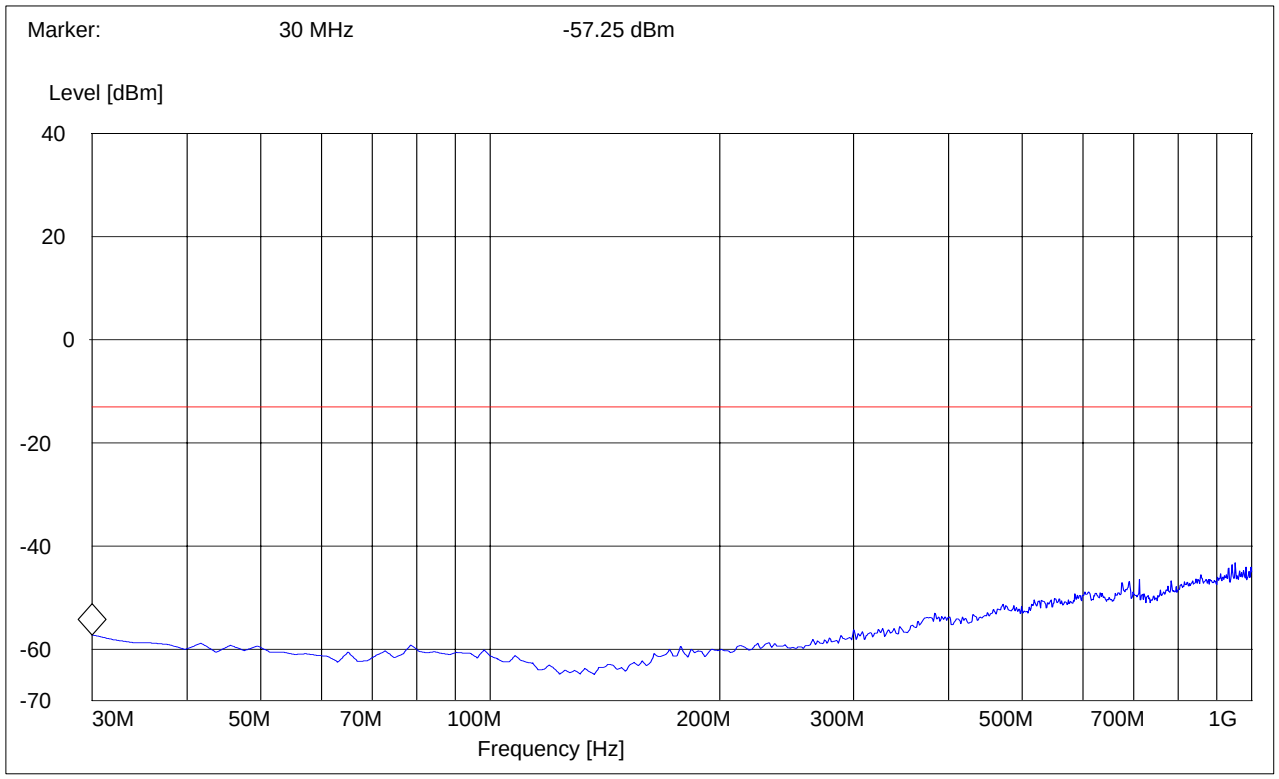
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
IDLE: 30MHz - 1GHz
Spurious emission limit –13dBm
Antenna: horizontal

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

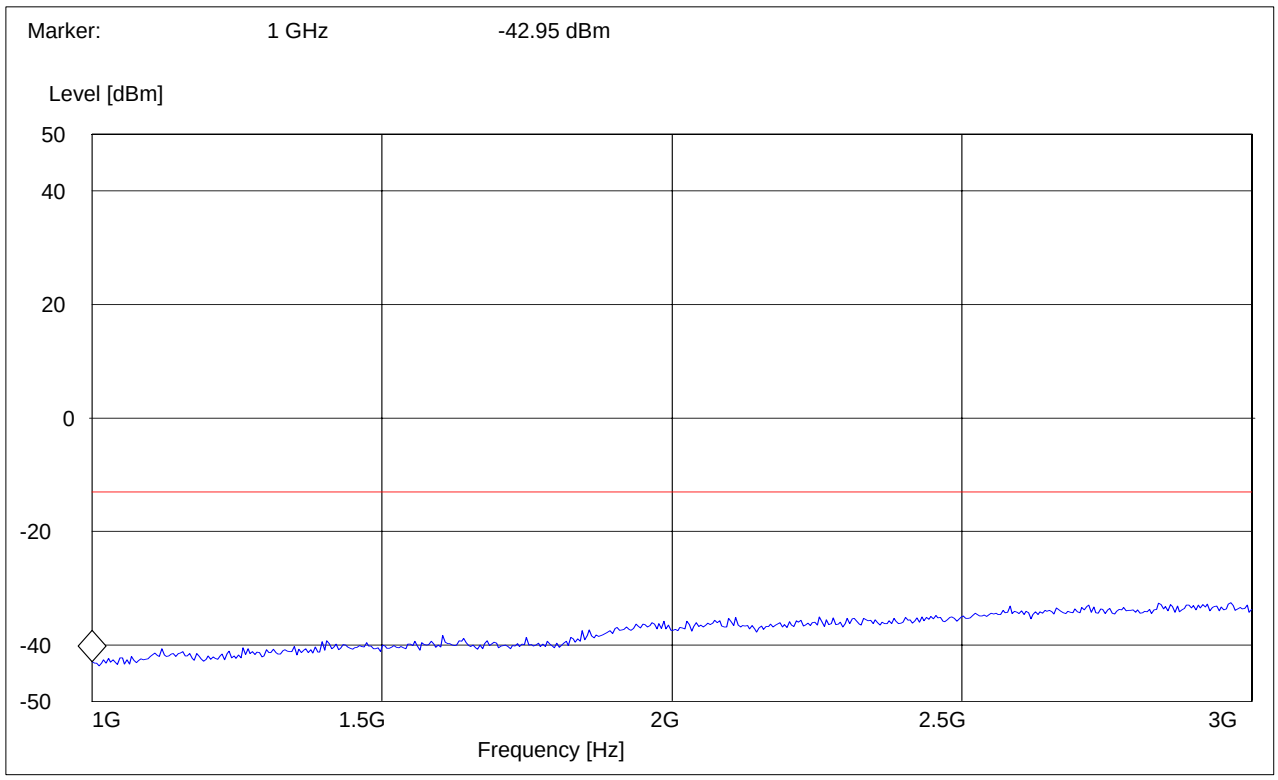
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
IDLE: 1GHz – 3GHz
Spurious emission limit –13dBm

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

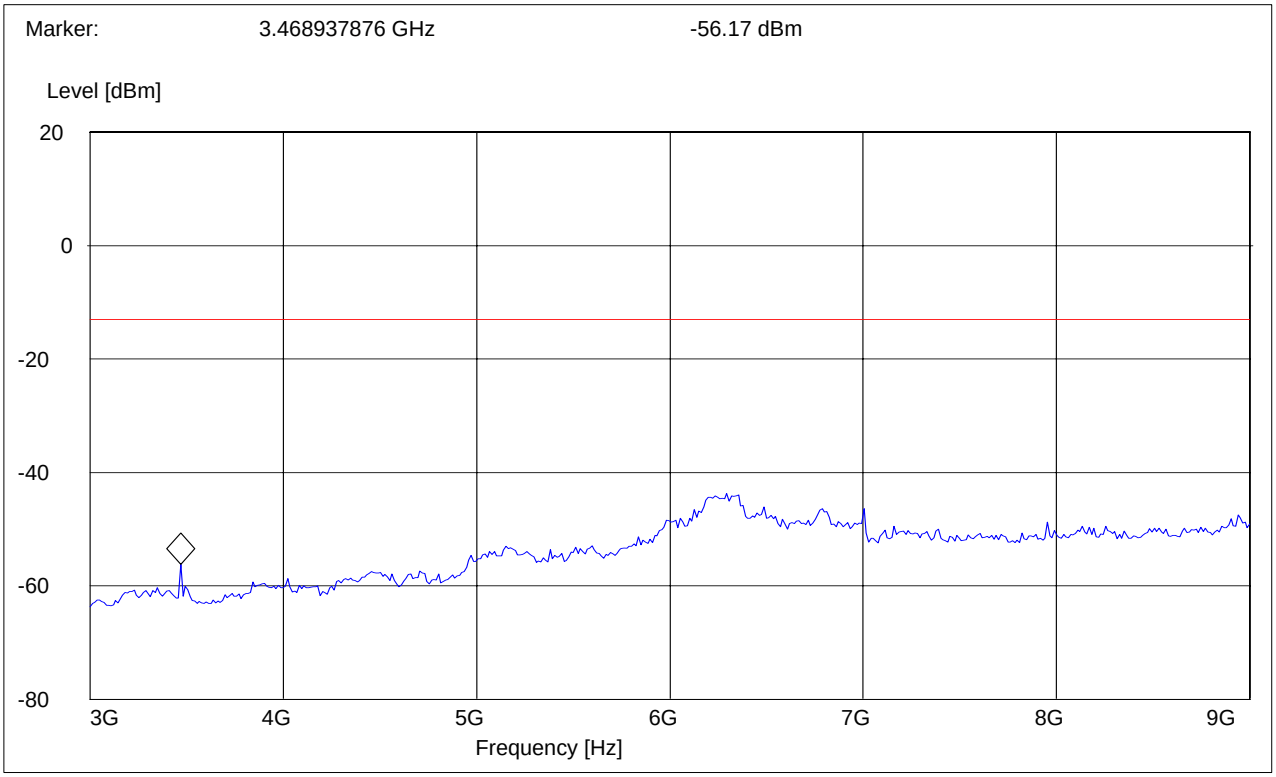
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (GSM-850)
IDLE: 3GHz – 9GHz

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

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



RESULTS OF RADIATED TESTS PCS-1900:

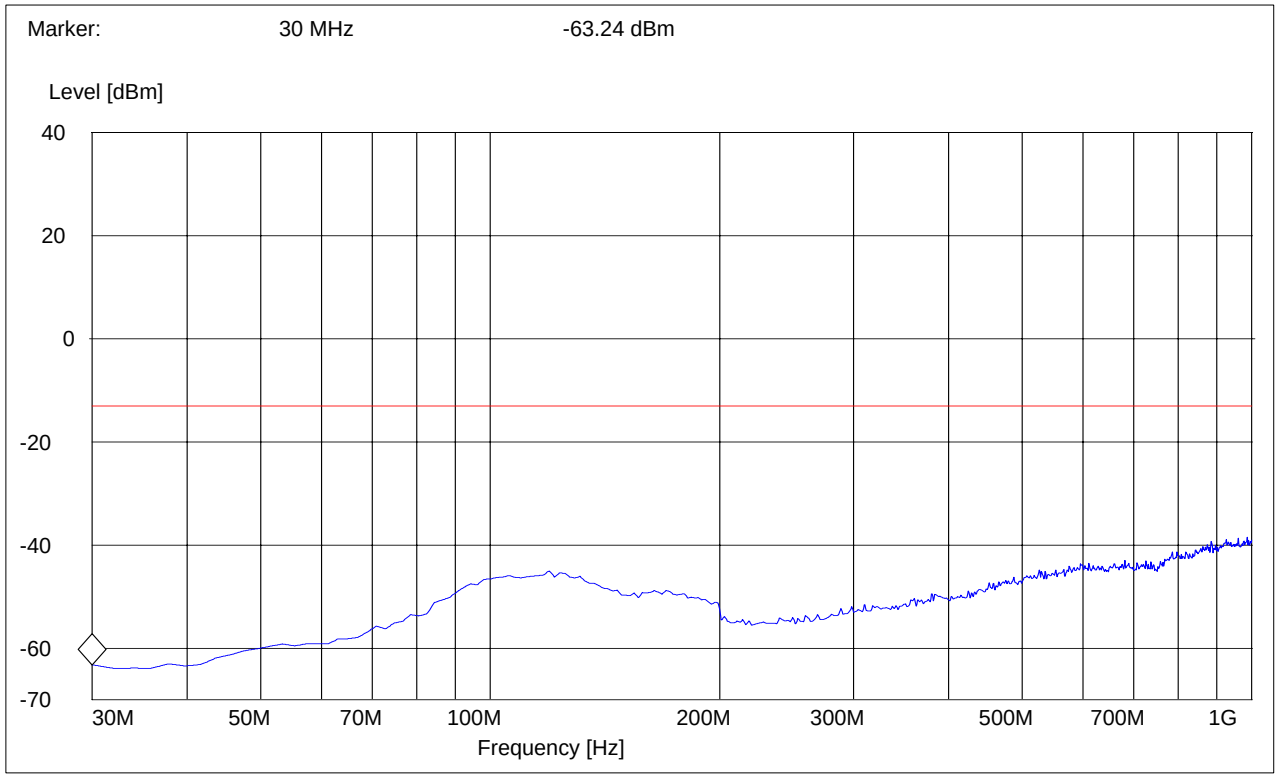
Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
2	**3700.4**	-43.23	**3760**	-39.63	**3819.6**	-41.23
3	**5550.6**	-44.38	**5640**	-39.21	**5729.4**	-38.39
4	**7400.8**	-38.12	**7520**	-44.88	**7639.2**	-38.92
5	**9251**	-39.80	**9400**	-33.34	**9549**	-34.19
6	**11101.2**	-33.11	**11280**	-25.45	**11458.8**	-22.78
7	**12951.4**	-37.25	**13160**	-30.74	**13368.6**	-28.53
8	**14801.6**	-37.62	**15040**	-33.59	**15278.4**	-39.17
9	**16651.8**	NF	**16920**	NF	**17188.2**	-37.27
10	**18502**	NF	**18800**	NF	**19098**	-33.78
NF = NOISE FLOOR						

RADIATED SPURIOUS EMISSIONS(PCS 1900)
TX: 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)

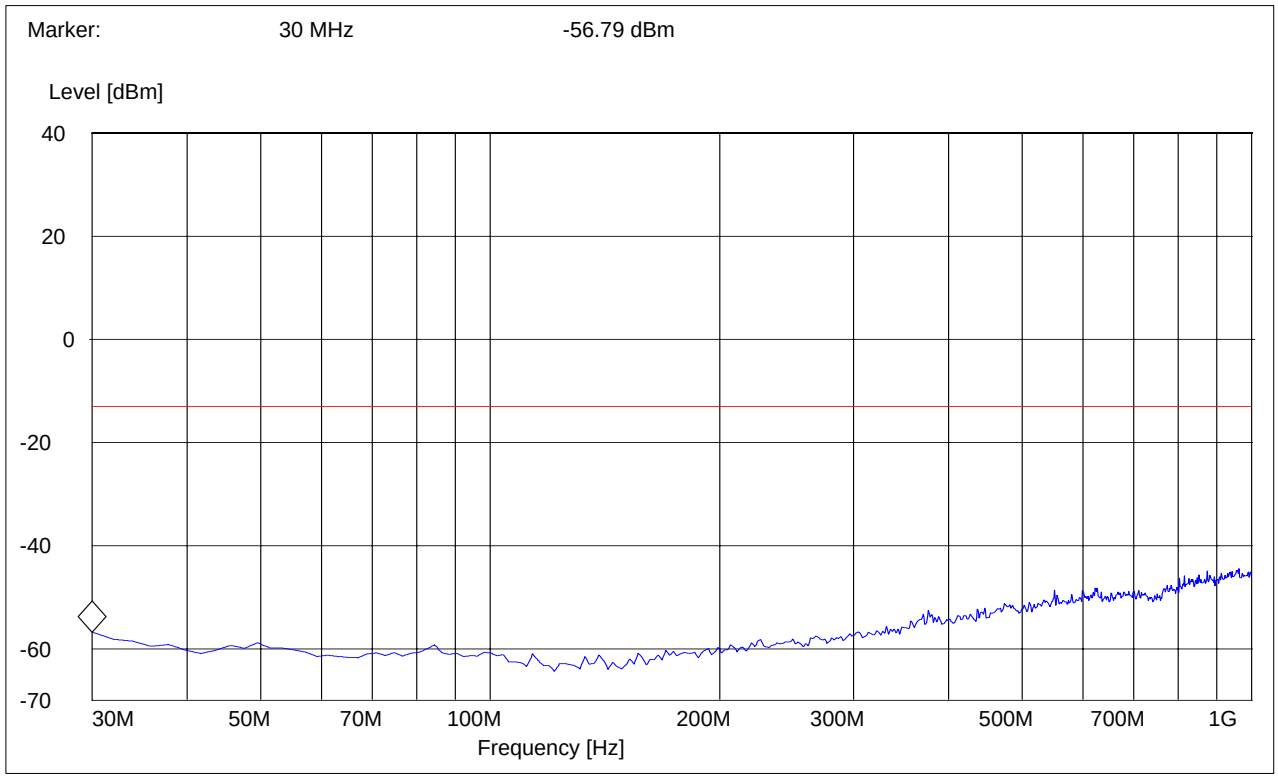


RADIATED SPURIOUS EMISSIONS(PCS 1900)
TX: 30MHz - 1GHz
Spurious emission limit –13dBm
Antenna: horizontal

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)

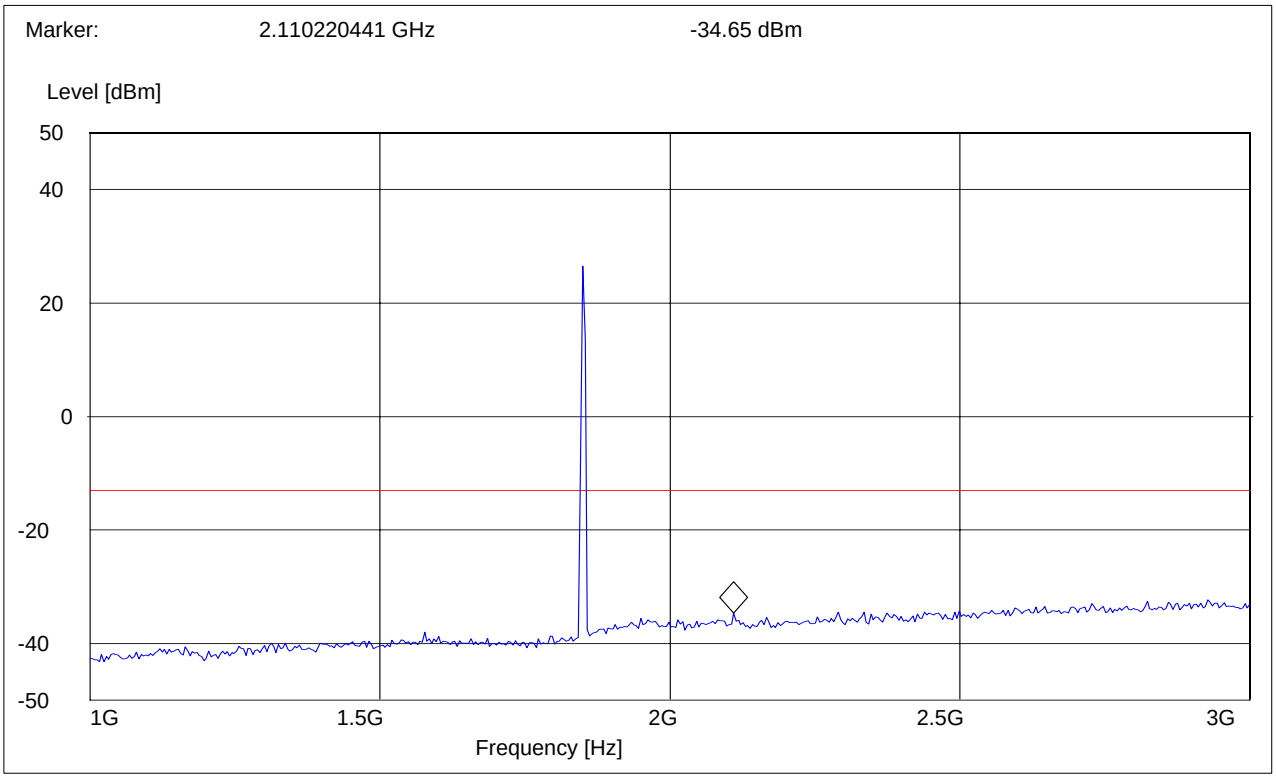


RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx @ 1850.2MHz: 1GHz – 3GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC Spuri 1-3G"

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

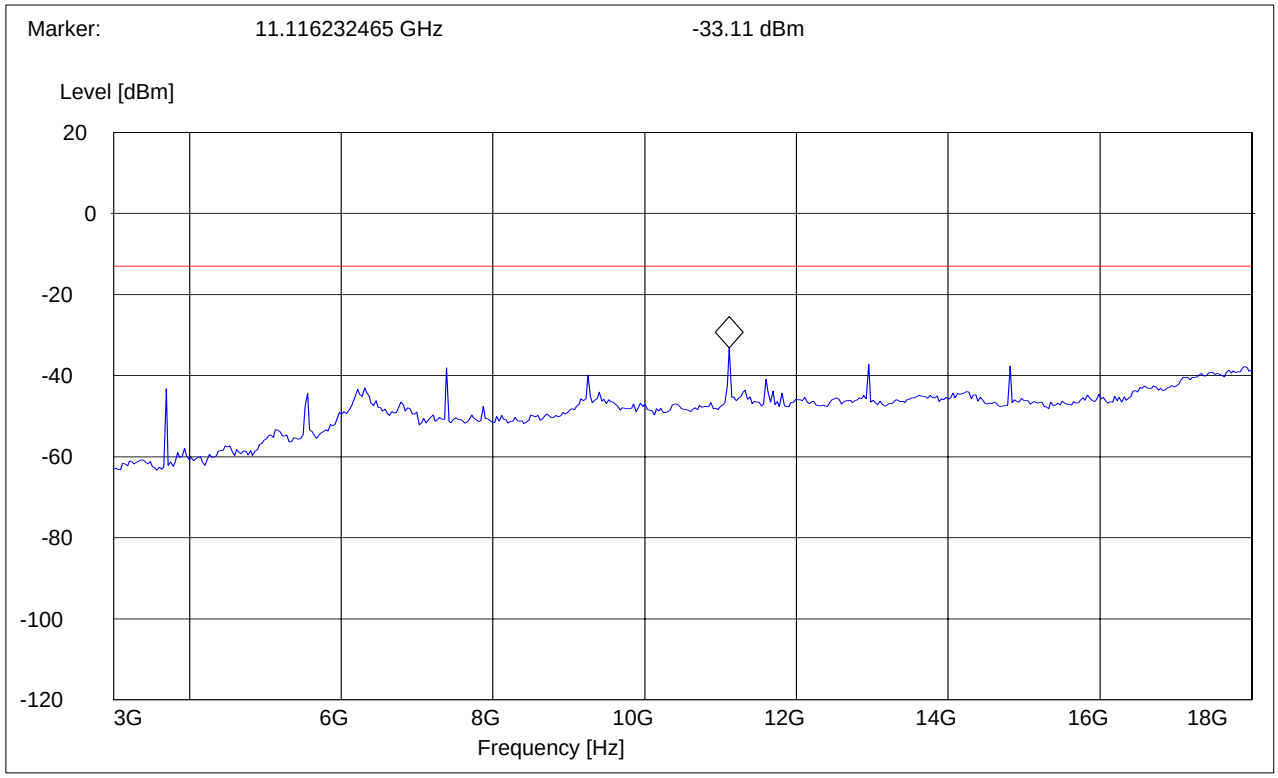
Note: The peak above the limit line is the carrier freq. at ch-512.



RADIATED SPURIOUS EMISSIONS(PCS 1900)
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

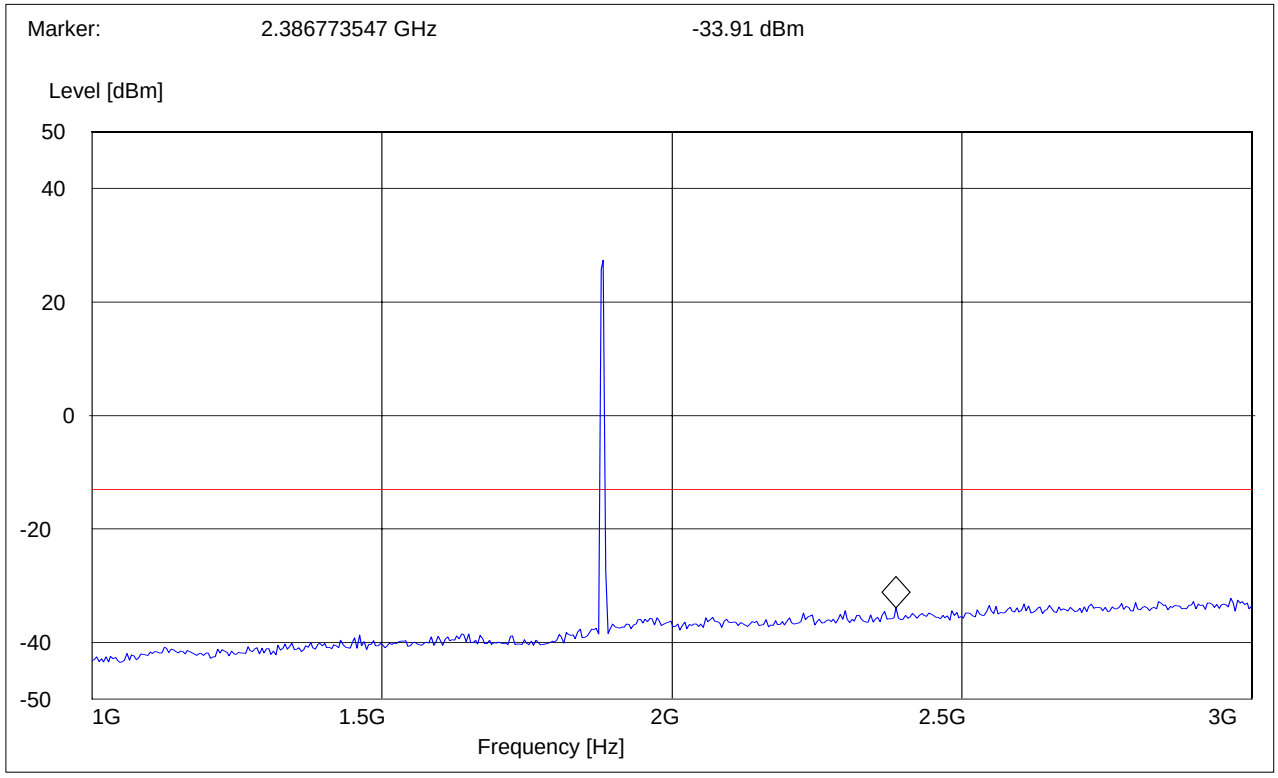


RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx @ 1880.0MHz: 1GHz – 3GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC Spuri 1-3G"

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

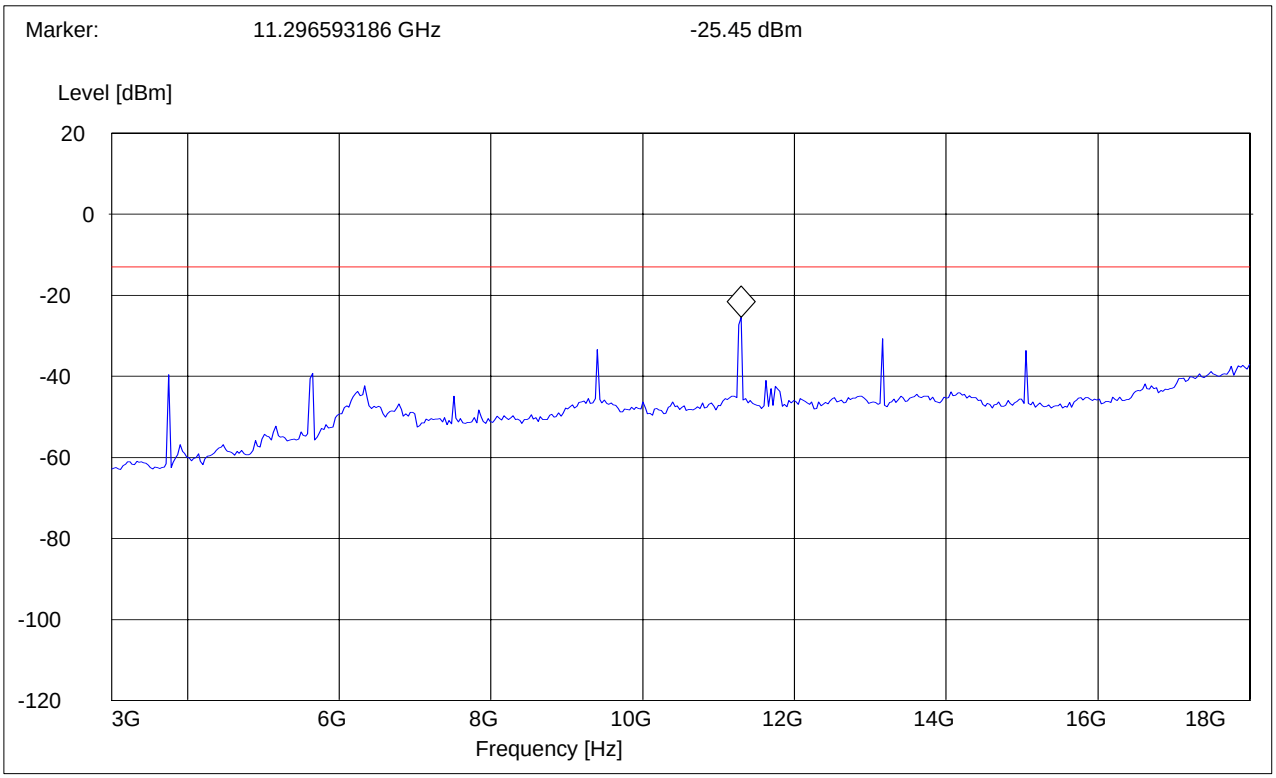
Note: The peak above the limit line is the carrier freq. at ch-661.



RADIATED SPURIOUS EMISSIONS(PCS 1900)
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

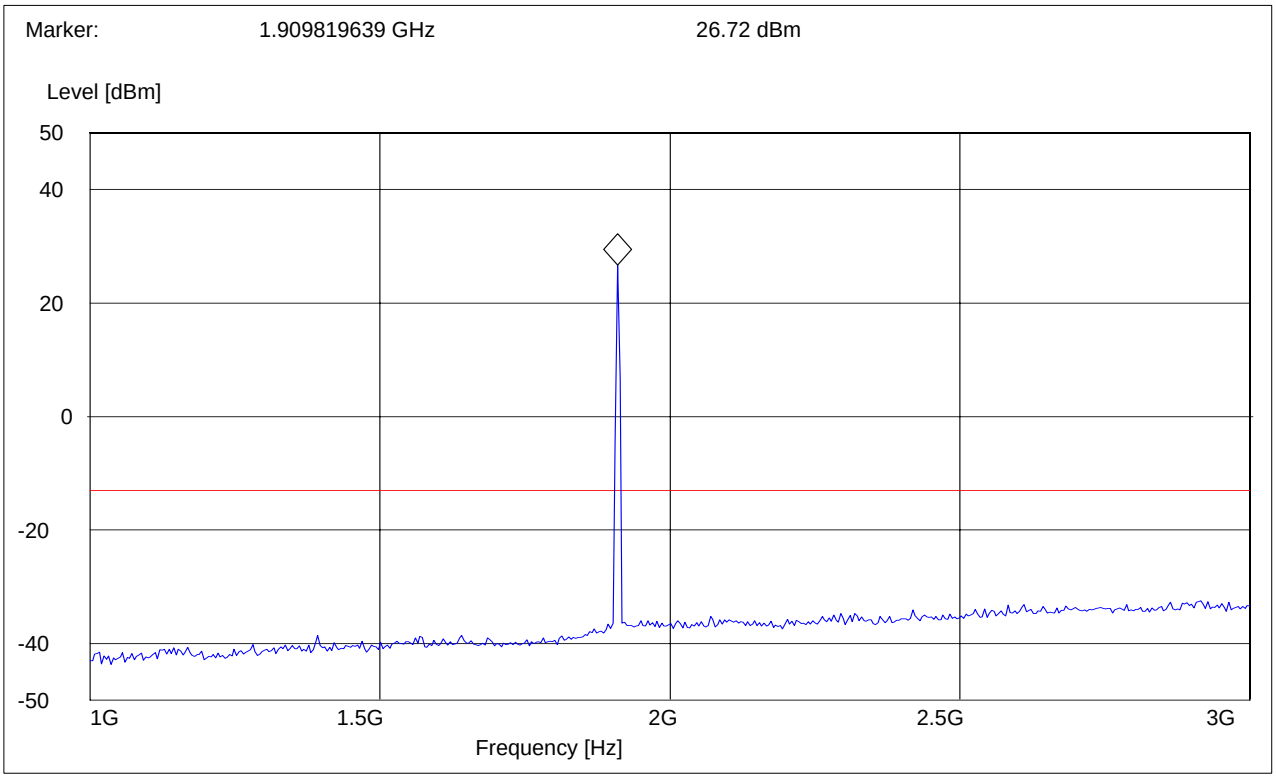


RADIATED SPURIOUS EMISSIONS(PCS 1900)
Tx @ 1909.8MHz: 1GHz – 3GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC Spuri 1-3G"

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

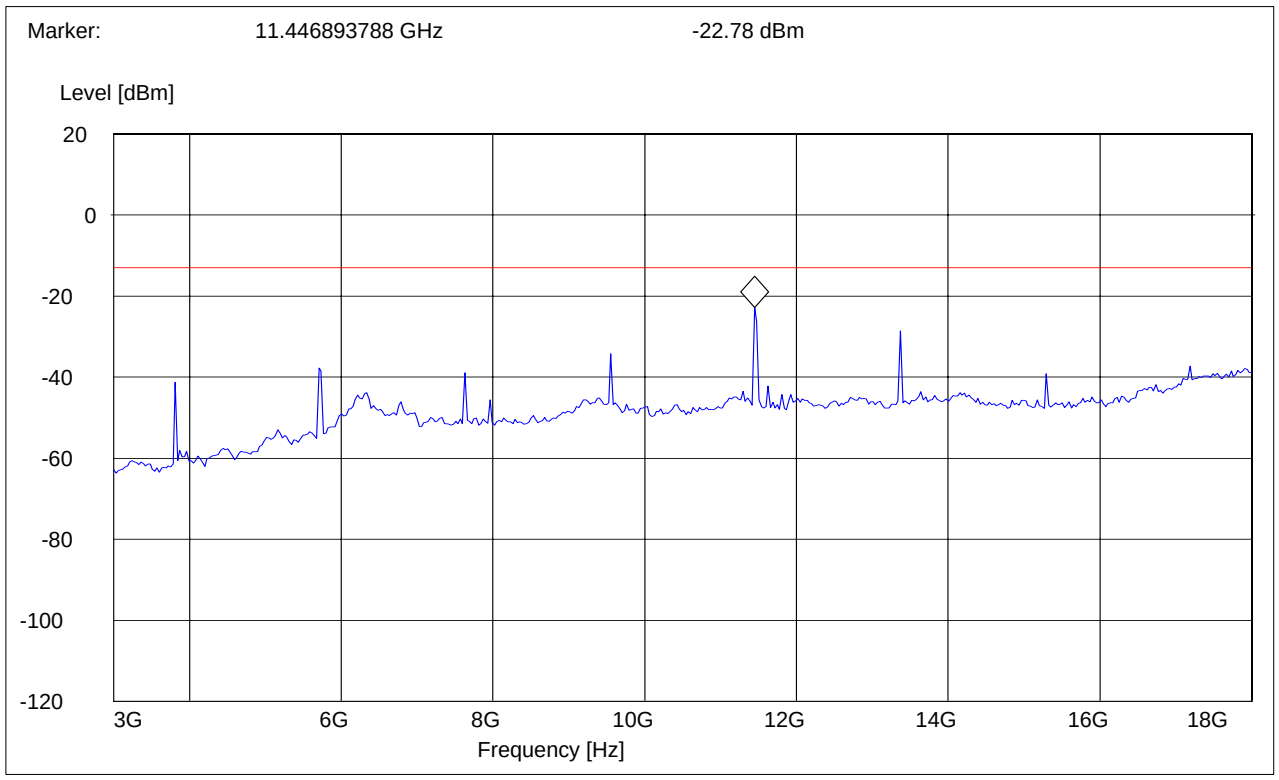
Note: The peak above the limit line is the carrier freq. at ch-810.



RADIATED SPURIOUS EMISSIONS(PCS 1900)
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

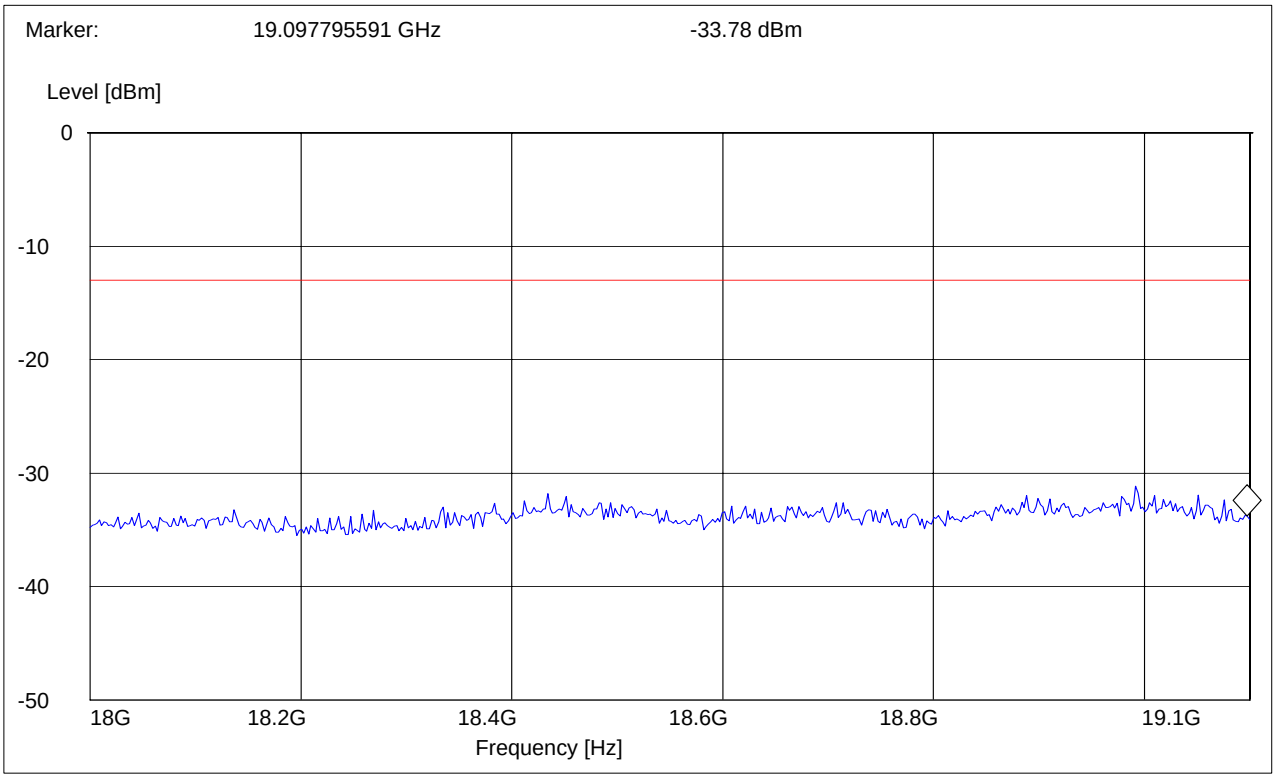


RADIATED SPURIOUS EMISSIONS(PCS 1900)
18GHz – 19.1GHz
Spurious emission limit –13dBm

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

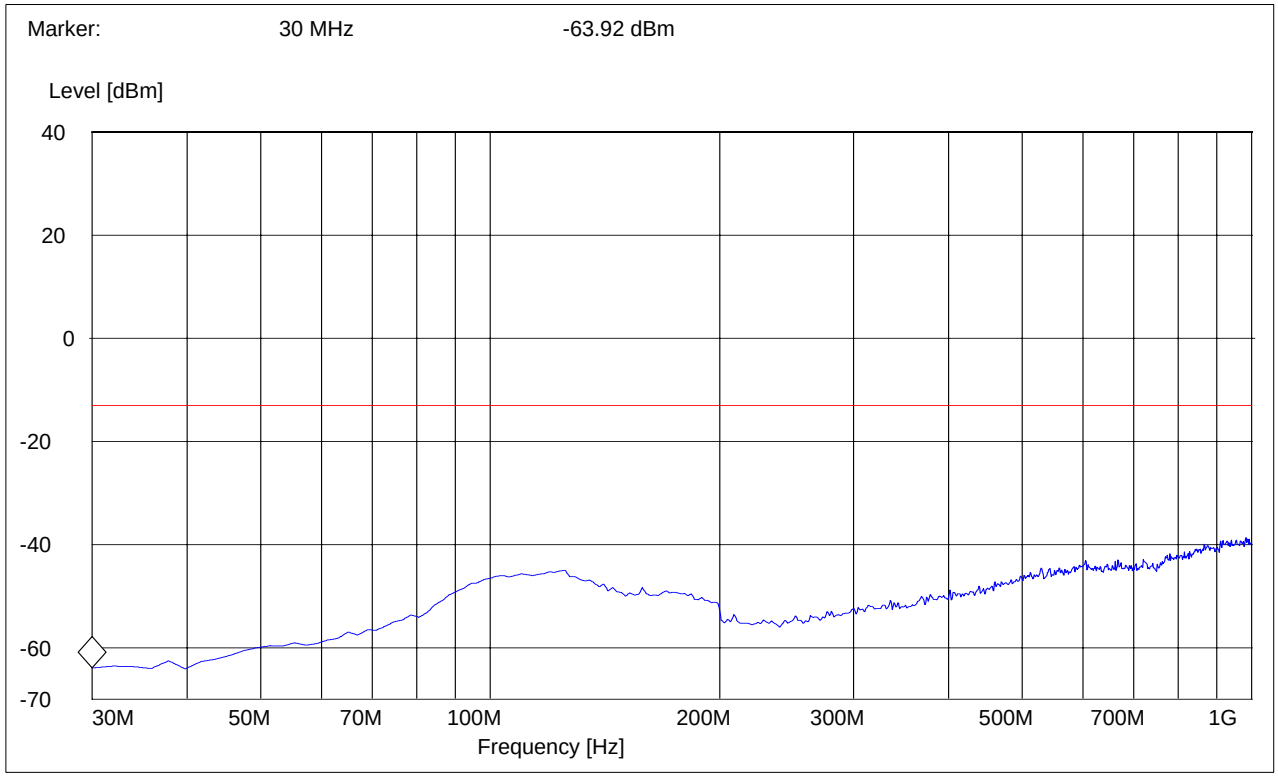
Note: This plot is valid for low, mid & high channels (worst-case plot)



RADIATED SPURIOUS EMISSIONS (IDLE MODE)
EUT in Idle Mode: 30MHz – 1GHz
Spurious emission limit –13dBm
Antenna: vertical

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

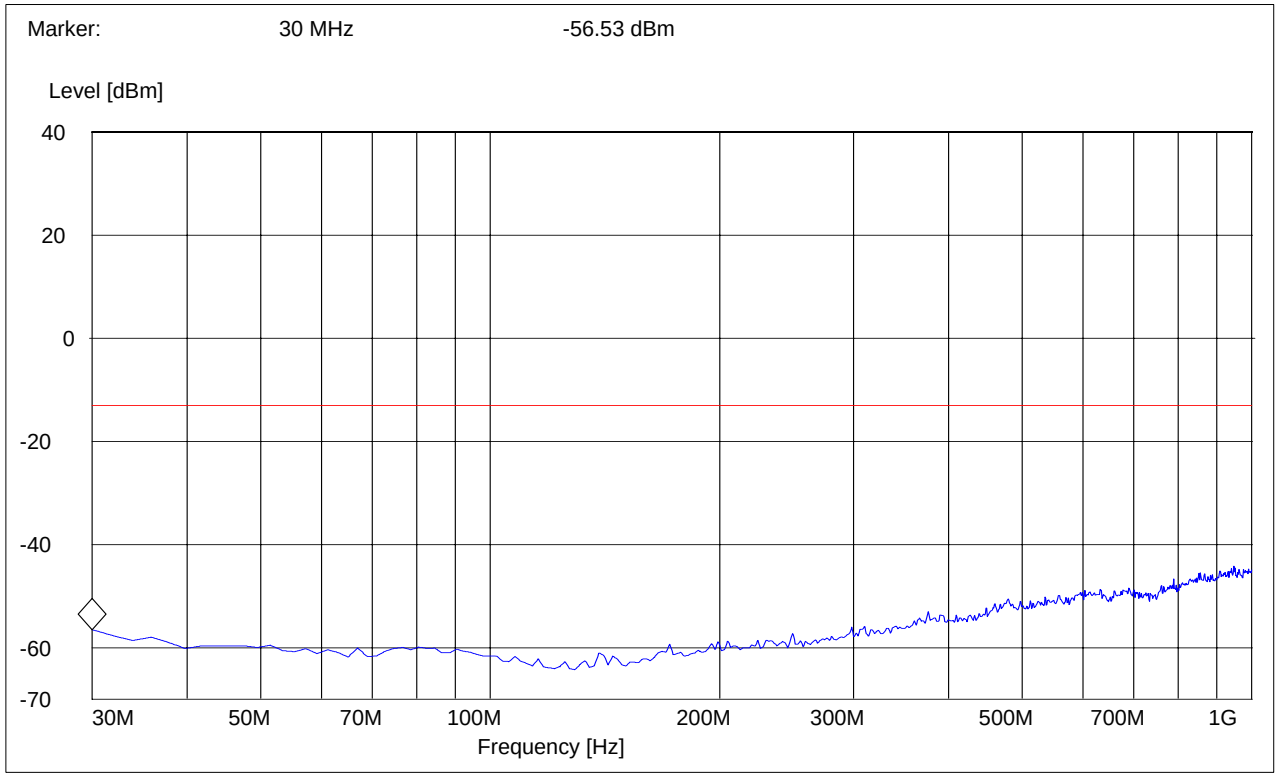
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (IDLE MODE)
EUT in Idle Mode: 30MHz – 1GHz
Spurious emission limit –13dBm
Antenna: horizontal

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

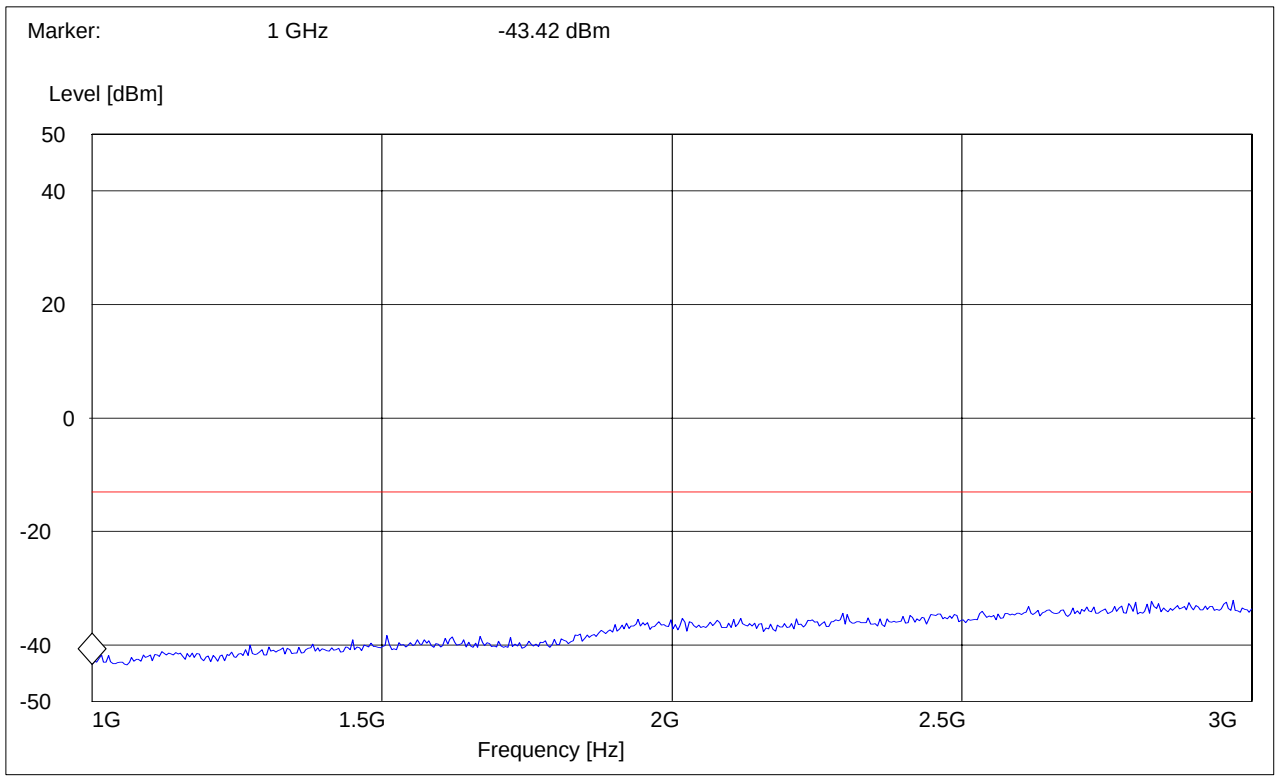
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (IDLE MODE)
EUT in Idle Mode: 1GHz – 3GHz
Spurious emission limit –13dBm

SWEEP TABLE: "FCC Spuri 1-3G"

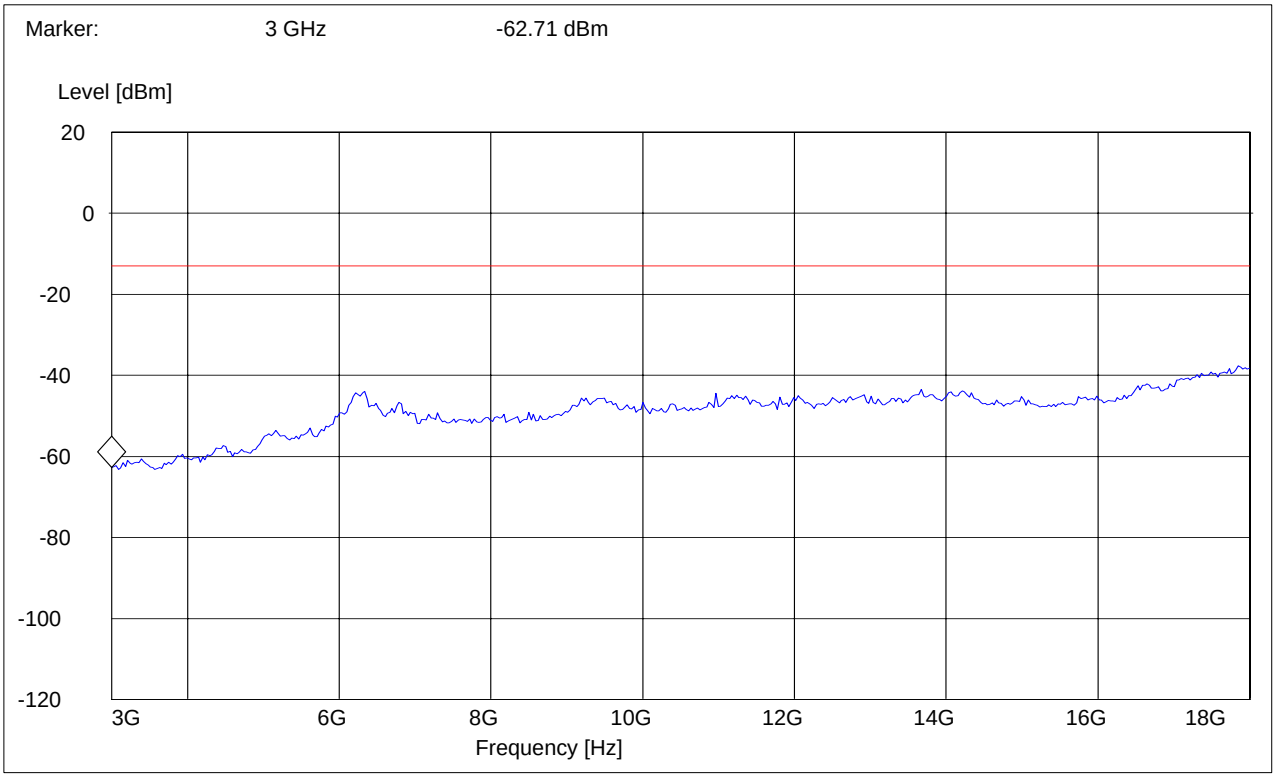
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz



RADIATED SPURIOUS EMISSIONS (IDLE MODE)
EUT in Idle Mode: 3GHz – 18GHz
Spurious emission limit –13dBm

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

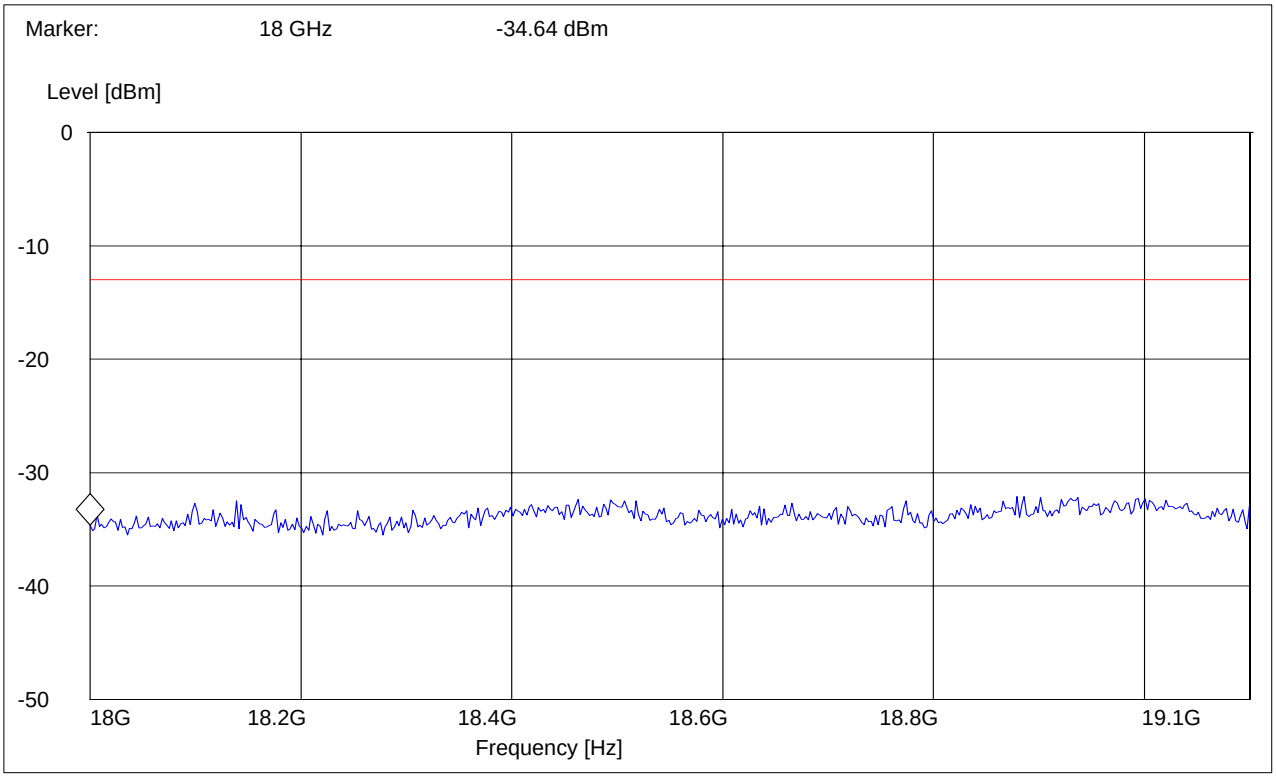
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz



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



5.3 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 26.5GHz 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 (µV/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

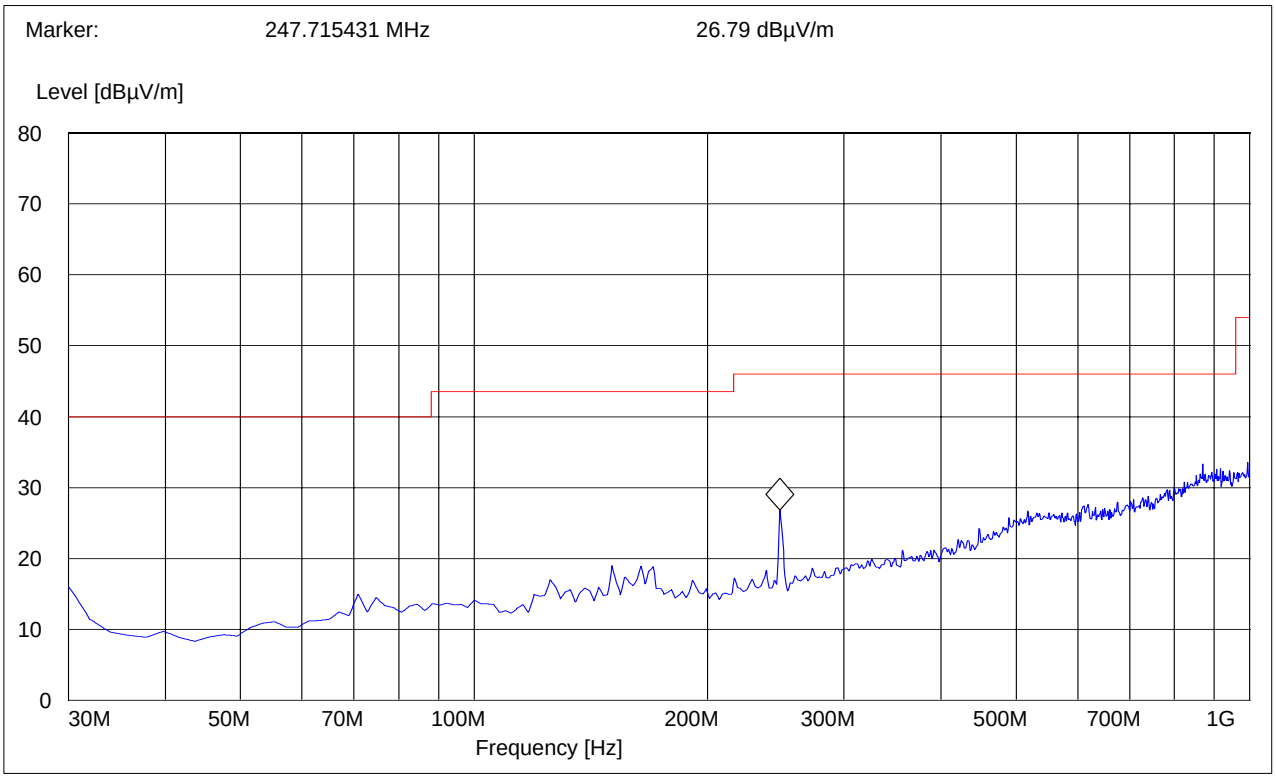
5.3.1 Receiver Spurious on EUT

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

NOTE: PEAK READING VS. QUASI-PEAK LIMIT

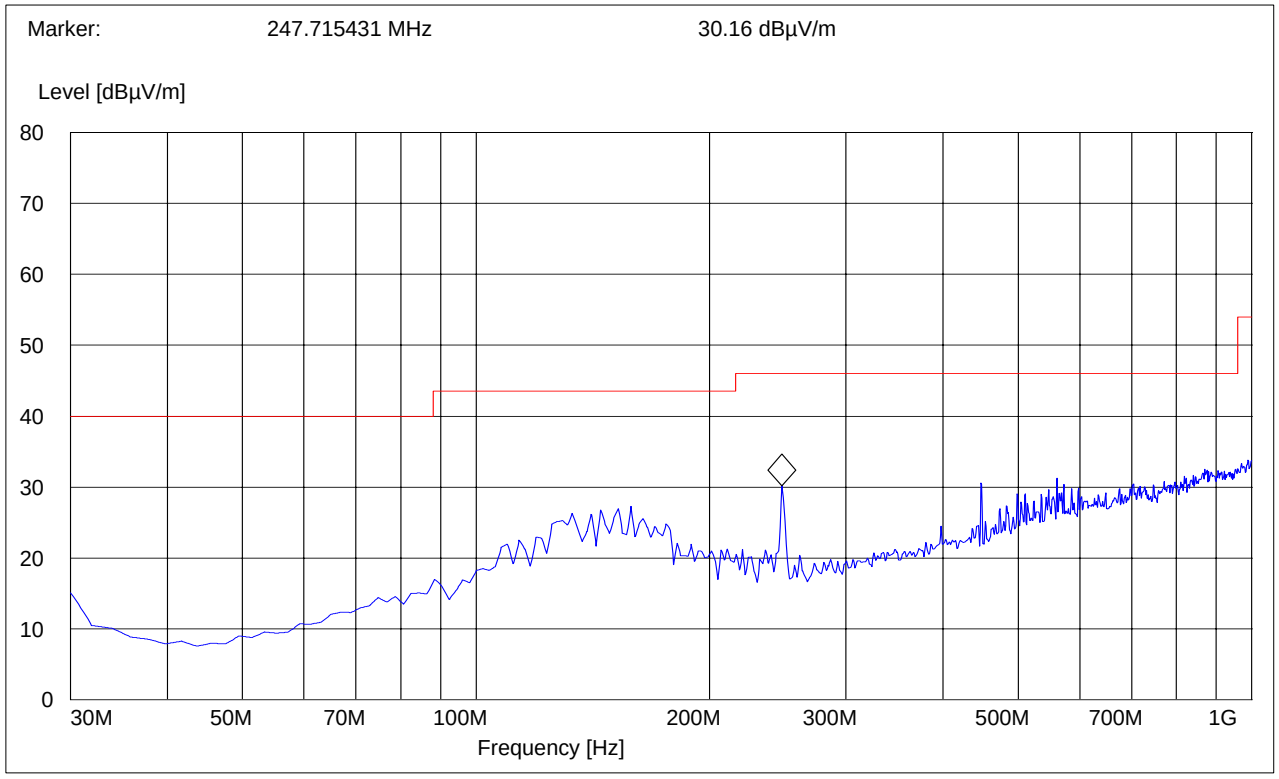


RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 30MHz – 1GHz
Antenna: horizontal

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

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

NOTE: PEAK READING VS. QUASI-PEAK LIMIT



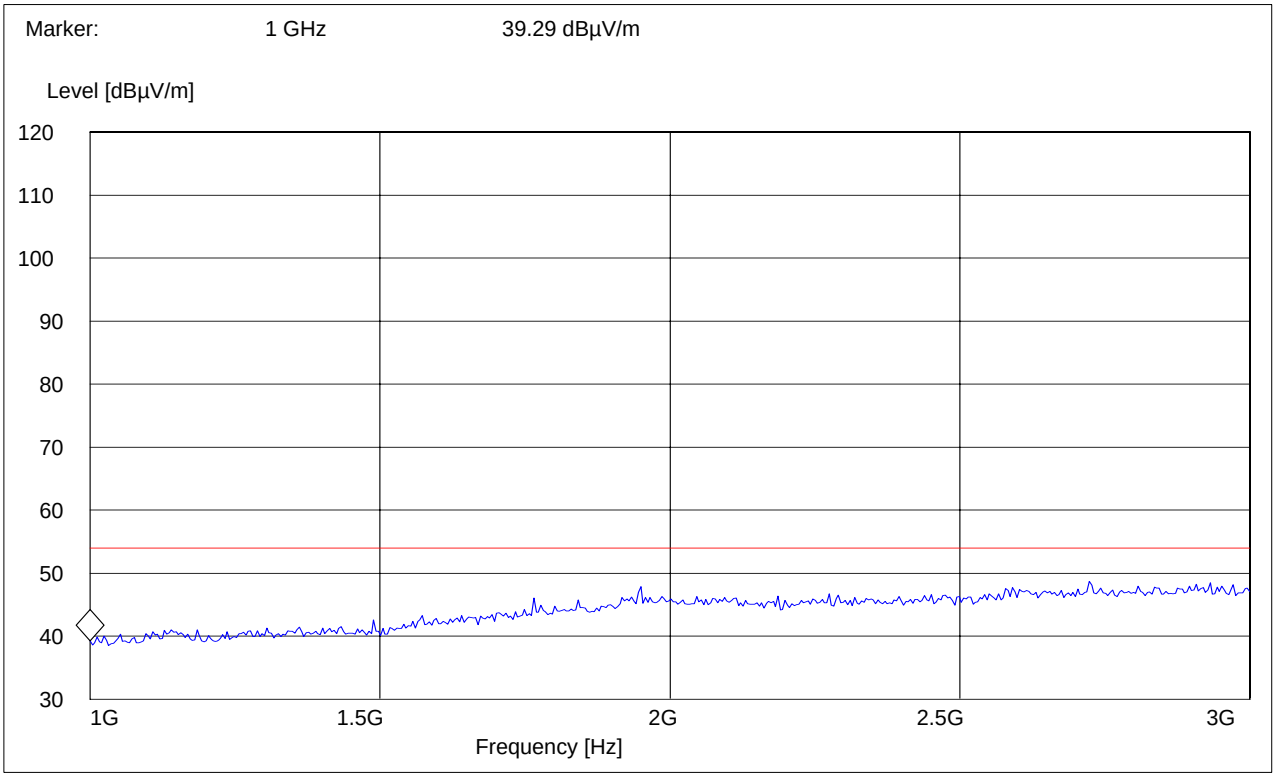
RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 1GHz – 3GHz

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

NOTE: PEAK READING VS. AVERAGE LIMIT

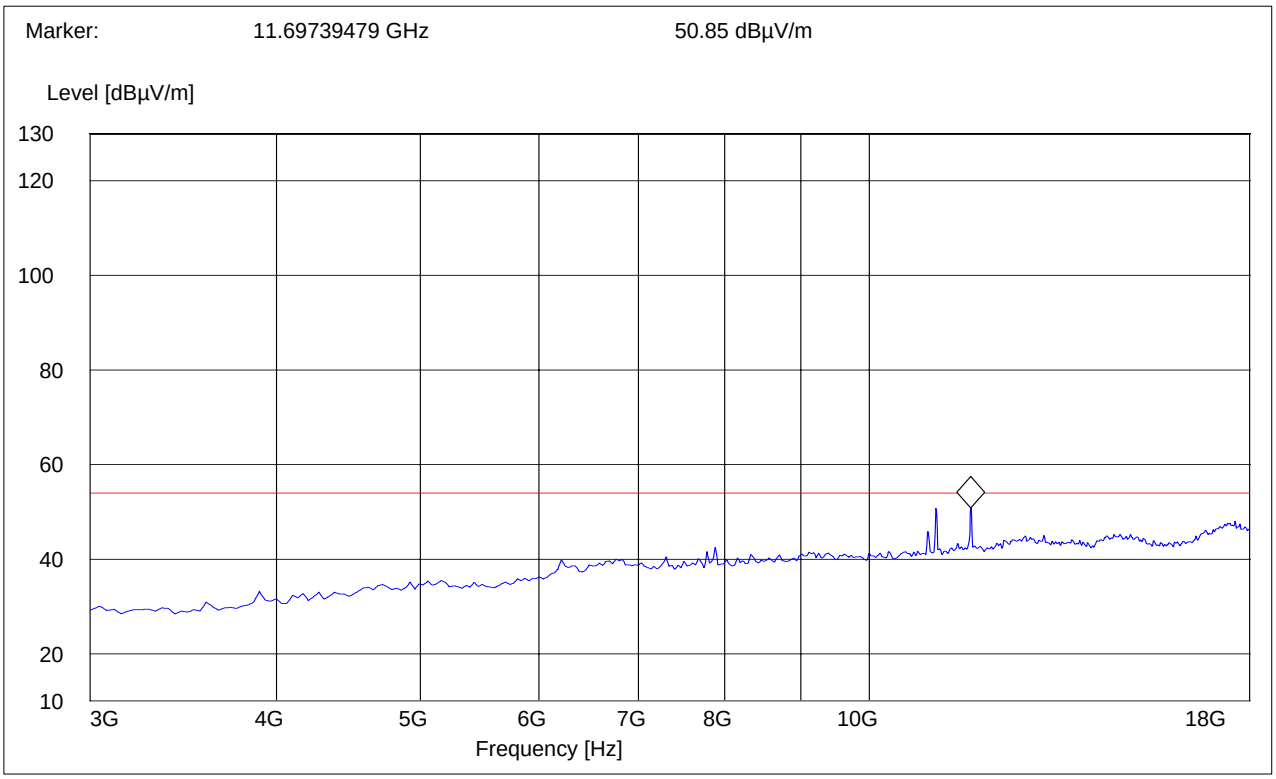


RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 3GHz – 18GHz

SWEEP TABLE: "FCC spuri 3-18G"

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

NOTE: PEAK READING VS. AVERAGE LIMIT

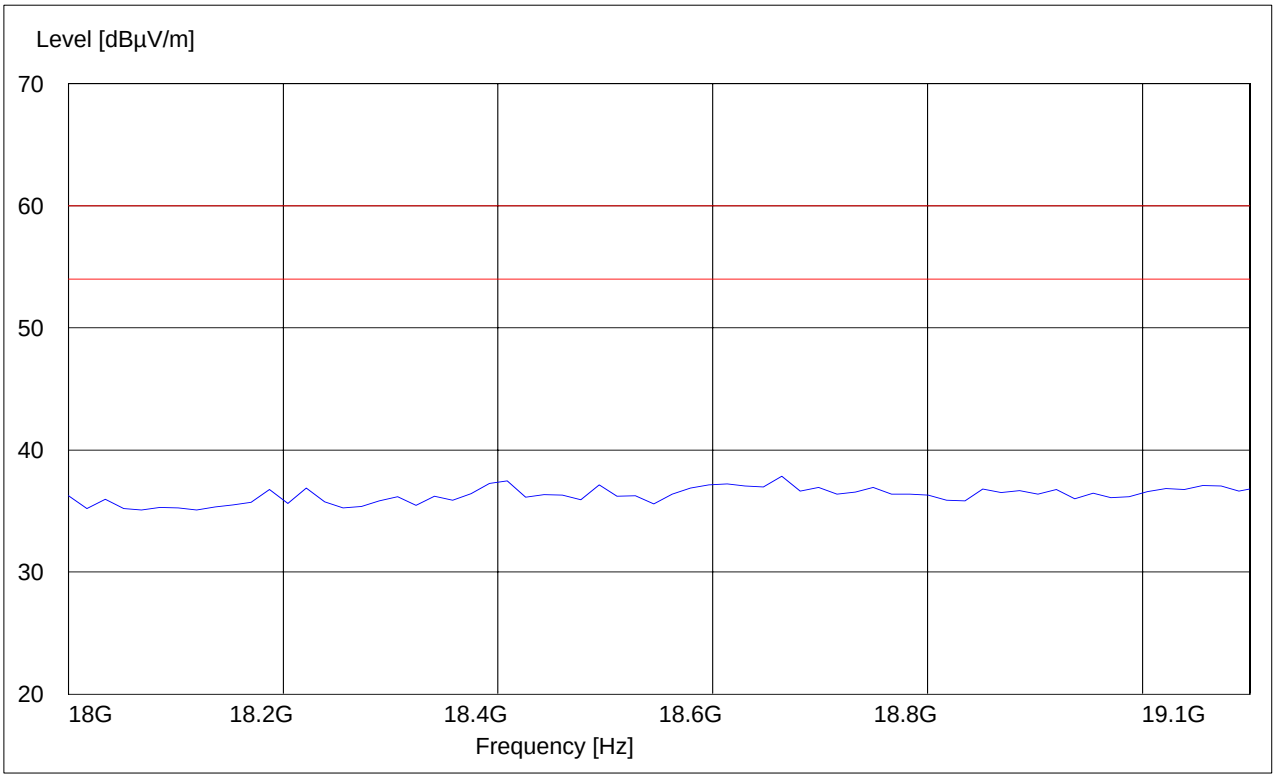


RECEIVER RADIATED EMISSIONS
EUT in Idle Mode: 18GHz – 19.1GHz

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

NOTE: PEAK READING VS. AVERAGE LIMIT



5.4 AC POWERLINE CONDUCTED EMISSIONS § 15.107/207

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

Prescans were performed on both 850/1900 bands, full testing on the worst-case band is submitted in the test report.

5.4.1 Results EUT

LISN

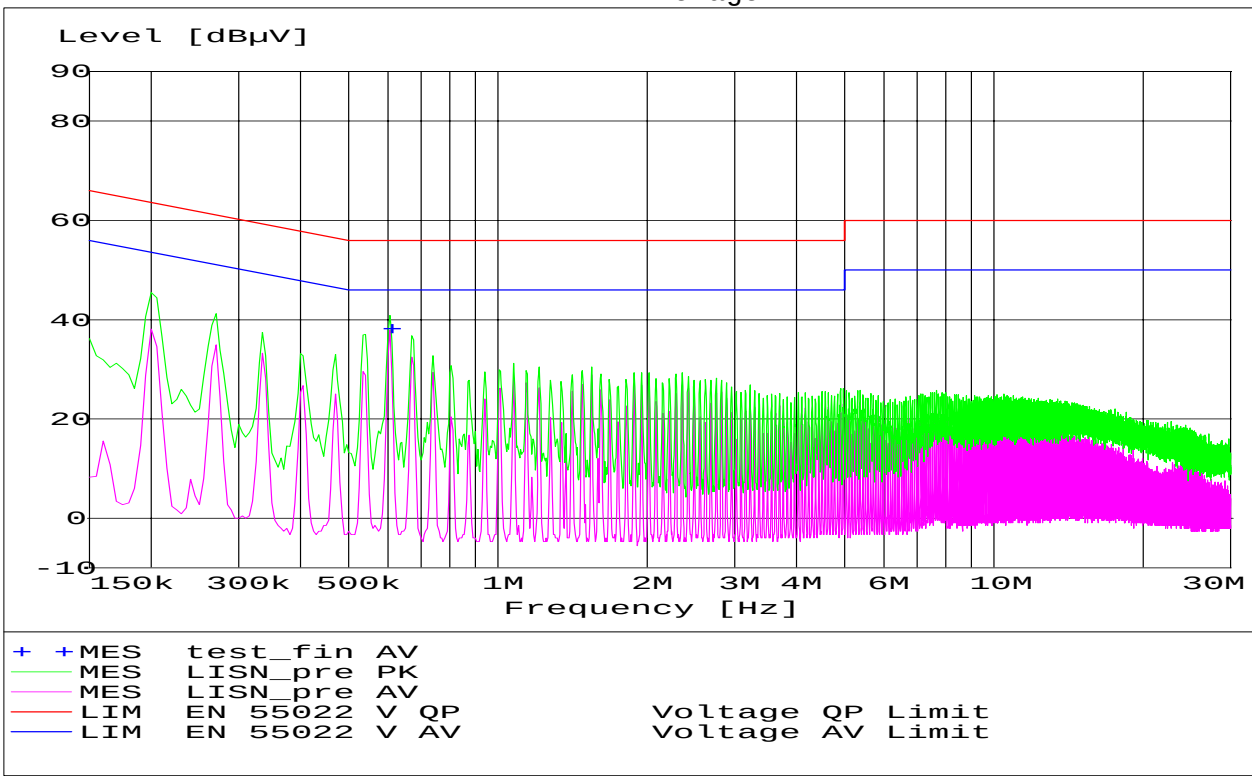
411 Dixon Landing Road, CA 95035

```
EUT / Description: d7900 mc46
Manufacturer:      hhp
Test mode:         PCS 1900 traffic channel-661
Test Engineer:     Neelesh
Phase:             L & N
Comment:           110 volt

Start of Test:     1/16/2006 / 8:29:16AM
```

SCAN TABLE: "EN 55022 Voltage"

```
   Short Description:            EN 55022 Voltage
   Start      Stop       Step       Detector  Meas.    IF
Transducer
   Frequency  Frequency  Width                Time     Bandw.
   150.0 kHz  30.0 MHz   5.0 kHz    MaxPeak   10.0 ms  9 kHz    None
                                    Average
```



MEASUREMENT RESULT: "test_fin AV"

1/16/2006 8:32AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.605000	38.00	0.0	46	8.0	N	GND

6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2006	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2006	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2006	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2006	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2006	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2006	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2006	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2006	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2006	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2006	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2006	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2006	1 year

7 References

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,
PART 2--FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS October 1**,** 2001.

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,
PART 22 PUBLIC MOBILE SERVICES October 1, 1998.

FCC Report and order 02-229 September 24, 2002.

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,
PART 24 PERSONAL COMMUNICATIONS SERVICES October 1, 1998.

ANSI / TIA-603-B-2003 Land Mobile FM or PM Communications Equipment Measurement and Performance Standard November 7, 2002.

8 BLOCK DIAGRAMS

Radiated Testing