FCC / IC Test Report

FOR:

Honeywell
Model Name: LYRIC-3G

Product Description:
Honeywell 3G radio module

FCC ID: CFS8DLPHS8-US
IC ID: 573F-PHS8US

47 CFR Part 22, 24
RSS-132 Issue 3
RSS-133 Issue 2

TEST REPORT #: EMC_HONE2_045_15001_FCC_22_24_LYRIC_3G

DATE: 2015-4-21

FCC: Accredited

IC recognized # 3462B-1

***CETECOM* Inc.**
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CETECOM Inc. is a Delaware Corporation with Corporation number: 2905571

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1 Assessment

The following equipment as further described in section 3 of this test report was evaluated against the applicable criteria for cabinet radiation only as specified in FCC CFR47 Parts 22 and 24 and Industry Canada Radio Standard Specifications RSS-132 Issue 3 and RSS-133 Issue 2. No deviations were ascertained during the course of the tests performed.

Company	Description	Model #
Honeywell	**Honeywell 3G radio module**	**LYRIC-3G**

Report reviewed by:

Date	Section	Name	Signature
2015-04-22	Compliance	Franz Engert (Compliance Manager)	Digitally signed by Franz Engert DN: cn=Franz Engert, c=US, o=CETECOM, ou=Complience, email=franz.engert@cetecom.com Date: 2015.04.22 11:01:58 -07'00'

Responsible for the Report:

Date	Section	Name	Signature
2014-04-22	Compliance	Douglas Antioco (EMC Engineer)	Douglas Antioco 2015.04.22 11:13:02 -07'00'

The test results of this test report relate exclusively to the test item specified in Section3.
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 CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	CETECOM Inc. 411 Dixon Landing Rd Milpitas, CA 95035
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Compliance Manager:	Franz Engert
Responsible Project Leader	Douglas Antioco

2.2 Identification of the Client

Applicant's Name:	Honeywell Security Group
Street Address:	2 Corporate Center Drive
City/Zip Code	Melville, NY 11747
Country	USA
Contact Person:	Paul Falvey
Phone No.	
Fax:	
e-mail:	paul.falvey@honeywell.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Same as client.
Manufacturers Address:	
City/Zip Code	
Country	

2.4 Dates of Testing:

2015-03-30

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name / Description:	LYRIC-3G
Model Number:	LYRIC-3G
FCC-ID :	CFS8DLPHS8-US
IC Cert Number:	573F-PHS8US
Product Description:	Honeywell 3G radio module
Technology / Type(s) of Modulation:	GSM, WCDMA
Operating Frequency Ranges (MHz) / Channels:	850MHz 1900MHz
Antenna info:	NA. Only enclosure emissions have been measured
Rated Operating Voltage Range:	Vmin: 5.5V - Vmax: 14V
Rated Operating Temperature Range:	
Test Sample Status:	Prototype
Radios contained in the device:	UMTS Gemalto PHS8-USA

3.2 Identification of the Equipment under Test (EUT)

EUT #	Serial Number	Sample Information	HW/SW Version
1	IMEI 3578 5505 0000 4145	Internal Antenna has been terminated with 50Ohm via SMD resistors	1.0/1.0

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number / PN
1	Development Board to connect product to DC power	Honeywell	NA	200-01449 REV A

4 Summary of Measurement Results

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1053 §24.238 RSS-133 6.5	Radiated Spurious Emissions enclosure	Nominal	GSM 1900	■	☐	☐	☐	Complies
§2.1053 §22.917 RSS-132 5.5	Radiated Spurious Emissions enclosure	Nominal	GSM 850	■	☐	☐	☐	Complies
§2.1053 §24.238 RSS-133 6.5	Radiated Spurious Emissions enclosure	Nominal	WCDMA Band II	■	☐	☐	☐	Complies
§2.1053 §22.917 RSS-132 5.5	Radiated Spurious Emissions enclosure	Nominal	WCDMA Band V	■	☐	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed

5 Measurements

5.1 Measurement Uncertainty

	Uncertainty in dB radiated <30MHz	**Uncertainty in in dB radiated 30MHz - 1GHz**	**Uncertainty in dB radiated > 1GHz**	**Uncertainty in dB Conducted measurement**
standard deviation k=1	2.48	1.94	2.16	0.64
95% confidence interval in dB	4.86	3.79	4.24	1.25
95% confidence interval in dB in delta to Result	+-2.5 dB	+-2.0 dB	+- 2.3dB	+-0.7dB

5.2 Nominal Environmental Test Conditions

- Ambient Temperature: 21-23 °C
- Relative humidity: 40-60%
- Test Voltage: 12.6 VDC(nominal)

5.3 Nominal Cellular Test Conditions

1. The different cellular operation modes of the EUT as required for testing are controlled through the link with the Digital Radio Communication Tester (R&S CMU200).
2. The EUT is tested on the low, mid and high channel of each of the supported cellular operation modes.

5.4 Additional Test Information

Testing is performed according to the guidelines provided in FCC publication (KDB) 971168 D01 v02r02, Measurement Guidance for Certification of Licensed Digital Transmitters and according to relevant parts of TIA-603C 2004 as detailed below.

According to "971168 D01 Power Meas License Digital Systems v02r02" section

7 FIELD STRENGTH OF SPURIOUS RADIATION
When antenna-port conducted measurements are performed to demonstrate compliance to the applicable unwanted emission limits, a separate radiated measurement is required 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.

Only cabinet radiation was measured in the scope of this report. This has been done in two setups accounting for the different traces on the PCB for external and internal antenna:

1. External antenna. A 50Ohm termination has been connected to the external antenna connector. Residual radiation of the fundamental from the PCB has been used to connect to the CMU 200 call box.

2. Internal antenna. A 50Ohm termination has been provided where the trace for the internal antenna transitions into the antenna pads. In order to cope with the maximum output power the EUT was transmitting multiple SMD resistors have been used in parallel summing up to 50Ohm. Residual radiation of the fundamental from the PCB has been used to connect to the CMU 200 call box.

6 Spurious Emissions Radiated

6.1 References

FCC: CFR Part 2.1053, CFR Part 22.917, CFR Part 24.238, CFR Part 27.53
IC: RSS-Gen issue 4, section 6.13; RSS-132 issue 3, section 5.5; RSS-133 issue 6, section 6.5

6.2 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.
For all power levels +30dBm to 0dBm, this becomes a constant specification of -13dBm.

6.2.1 FCC 22.917 Emission limitations for cellular equipment.

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

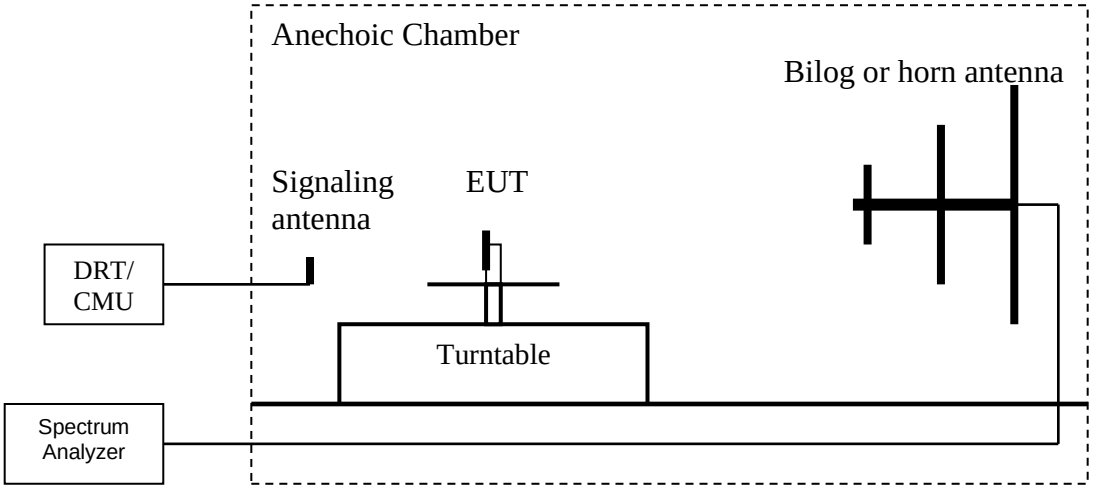
6.2.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

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

RSS-132 Section 5.5.1.1 and RSS-133 Section 6.5.1
In the first 1.0 MHz band immediately outside and adjacent to the licensee's frequency block, the power of emissions per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in watts) by at least 43 + 10 $\log_{10}$(P), dB. After the first 1.0 MHz, the power of emissions shall be attenuated below the transmitter output power by at least 43 + 10 $\log_{10}$(P), dB, in any 100 kHz bandwidth.
After the first 1.5 MHz, the power of emissions shall be attenuated below the transmitter output power by at least 43 + 10 $\log_{10}$(P), dB, in any MHz of bandwidth

6.3 Radiated out of band measurement procedure:

Ref: TIA-603C 2004- 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 Radio Communication 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:
8. Spurious (dBm) = LVL (dBm) + LOSS (dB):
9. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
10. Determine the level of spurious emissions using the following equation:
    Spurious (dBm) = LVL (dBm) + LOSS (dB):
11. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
12. (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.)

According to "971168 D01 Power Meas License Digital Systems v02r02" section

7 FIELD STRENGTH OF SPURIOUS RADIATION

When antenna-port conducted measurements are performed to demonstrate compliance to the applicable unwanted emission limits, a separate radiated measurement is required 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.

Only cabinet radiation was measured in the scope of this report. In order to measure only cabinet radiation the external antenna connector was connected through a coaxial cable directly to the CMU CDMA 2000 system simulator.

6.4 Sample Calculations for Radiated Measurements

Power Measurements using Substitution Procedure:

The measurement on the Spectrum Analyzer is used as a basis for the Substitution procedure.
The EUT is replaced with a Signal Generator and an antenna. The setting on the Signal Generator is varied until the Spectrum Analyzer displays the original reading. EIRP is calculated as-

EIRP (dBm)= Signal Generator setting (dBm)- Cable Loss (dB)+ Antenna Gain (dBi). Example below.

Frequency (MHz)	Measured SA (dBµV)	Signal Generator setting (dBm)	Antenna Gain (dBi)	Dipole Gain (dBd)	Cable Loss (dB)	EIRP (dBm)
1000	95.5	24.5	6.5	0	3.5	27.5

6.5 Spectrum Analyzer Settings

6.5.1 Settings for FCC 22

	9kHz -30MHz	30MHz – 1GHz	1 – 9GHz
Resolution Bandwidth	CISPR	100 kHz	1 MHz
Video Bandwidth	CISPR	100 kHz	1 MHz
Detector	Peak	Peak	Peak
Trace Mode	Scan	Scan	Scan
Sweep Time	2ms per step	2ms per step	2ms per step

6.5.2 Settings for FCC 24

	9kHz -30MHz	30MHz – 1 GHz	1 – 19.1 GHz
Resolution Bandwidth	CISPR	100 kHz	1 MHz
Video Bandwidth	CISPR	100 kHz	1 MHz
Detector	Peak	Peak	Peak
Trace Mode	Scan	Scan	Scan
Sweep Time	2ms per step	2ms per step	2ms per step

6.6 Summary Spurious Emission GSM 850 for internal and external antenna trace

Harmonic	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)	Limit FCC and IC (dBm)
2	1648.4	NF	1673.2	NF	1697.6	NF	-13
3	2472.6	NF	2509.8	NF	2546.4	NF	
4	3296.8	NF	3346.4	NF	3395.2	NF	
5	4121	NF	4183	NF	4244	NF	
6	4945.2	NF	5019.6	NF	5092.8	NF	
7	5769.4	NF	5856.2	NF	5941.6	NF	
8	6593.6	NF	6692.8	NF	6790.4	NF	
9	7417.8	NF	7529.4	NF	7639.2	NF	
10	8242	NF	8366	NF	8488	NF	
NF = Noise Floor							

6.7 Summary Spurious Emission GSM 1900 for internal and external antenna trace

Harmonic	Tx ch-25 Freq. (MHz)	Level (dBm)	Tx ch-600 Freq. (MHz)	Level (dBm)	Tx ch-1175 Freq. (MHz)	Level (dBm)	Limit FCC and IC (dBm)
2	3700.4	NF	3760	NF	3819.6	NF	-13
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	
NF = Noise Floor							

6.8 Summary Spurious Emission UMTS Band V

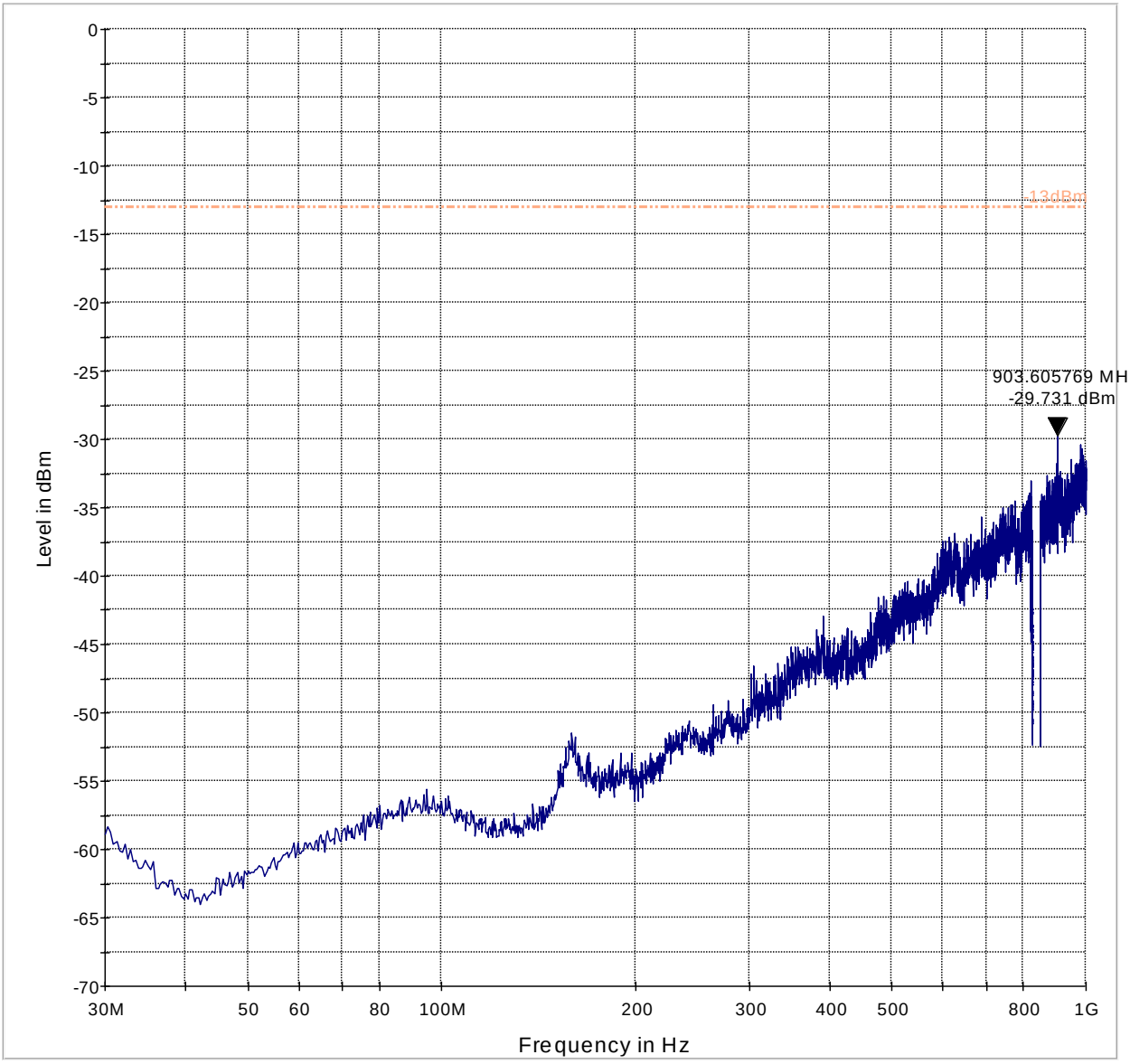
Harmonic	Tx ch-4132 Freq. (MHz)	Level (dBm)	Tx ch-4183 Freq. (MHz)	Level (dBm)	Tx ch-4233 Freq. (MHz)	Level (dBm)	Limit FCC and IC (dBm)
2	1652.8	NF	1673.2	NF	1693.2	NF	-13
3	2479.2	NF	2509.8	NF	2539.8	NF	
4	3305.6	NF	3346.4	NF	3386.4	NF	
5	4132	NF	4183	NF	4233	NF	
6	4958.4	NF	5019.6	NF	5079.6	NF	
7	5784.8	NF	5856.2	NF	5926.2	NF	
8	6611.2	NF	6692.8	NF	6772.8	NF	
9	7437.6	NF	7529.4	NF	7619.4	NF	
10	8264	NF	8366	NF	8466	NF	
NF = Noise Floor							

6.9 Summary Spurious Emission UMTS Band II

Harmonic	Tx ch-9262 Freq. (MHz)	Level (dBm)	Tx ch-9400 Freq. (MHz)	Level (dBm)	Tx ch-9538 Freq. (MHz)	Level (dBm)	Limit FCC and IC (dBm)
2	3704.8	NF	3760	NF	3815.2	NF	-13
3	5557.2	NF	5640	NF	5722.8	NF	
4	7409.6	NF	7520	NF	7630.4	NF	
5	9262	NF	9400	NF	9538	NF	
6	11114.4	NF	11280	NF	11445.6	NF	
7	12966.8	NF	13160	NF	13353.2	NF	
8	14819.2	NF	15040	NF	15260.8	NF	
9	16671.6	NF	16920	NF	17168.4	NF	
10	18524	NF	18800	NF	19076	NF	
NF = Noise Floor							

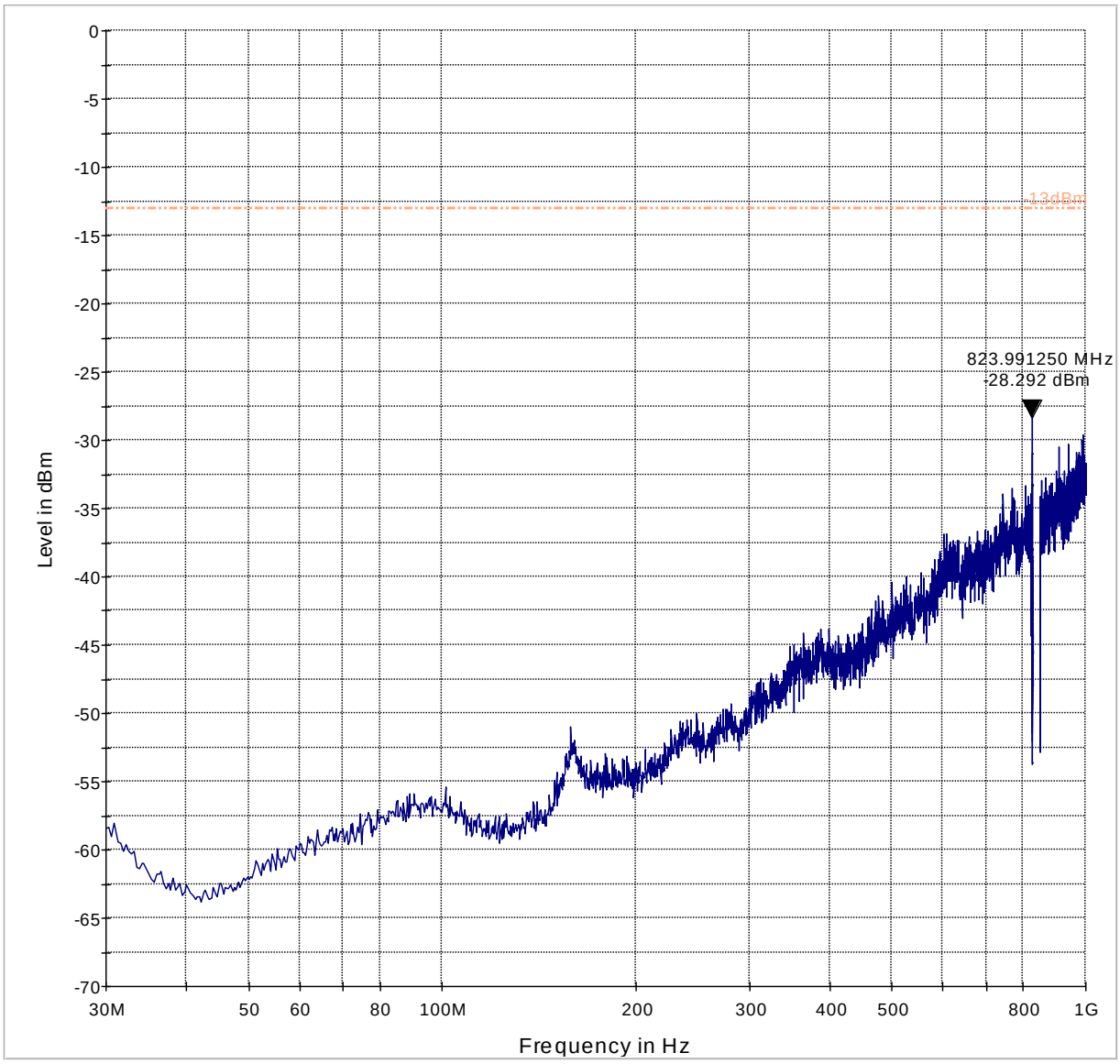
6.10 Radiated Emission Plots GSM 850

6.10.1 GSM-850 Tx Low Channel 30MHz-1GHz internal antenna trace

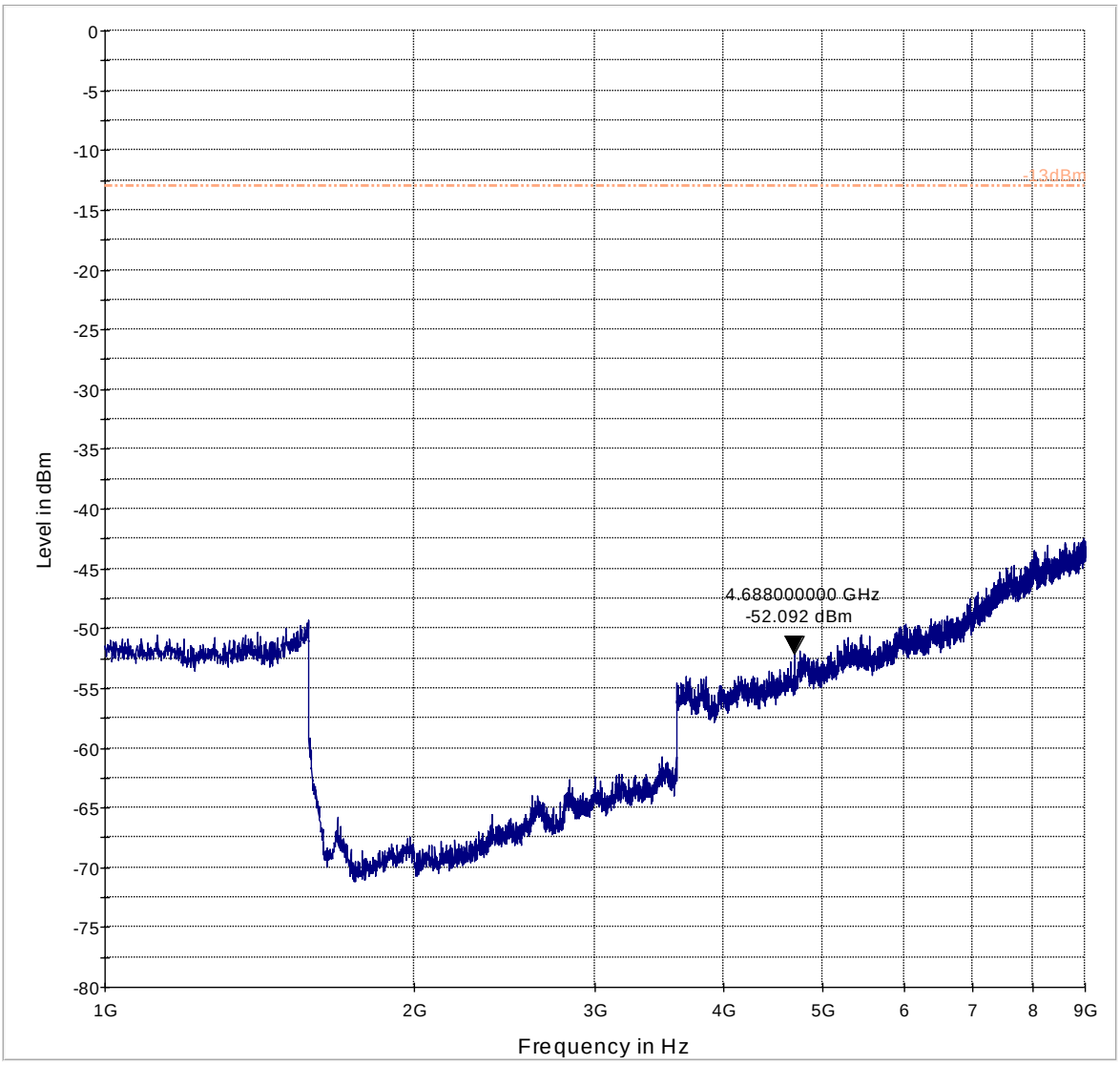


Note: Peak at 903 MHz is downlink from CMU 200

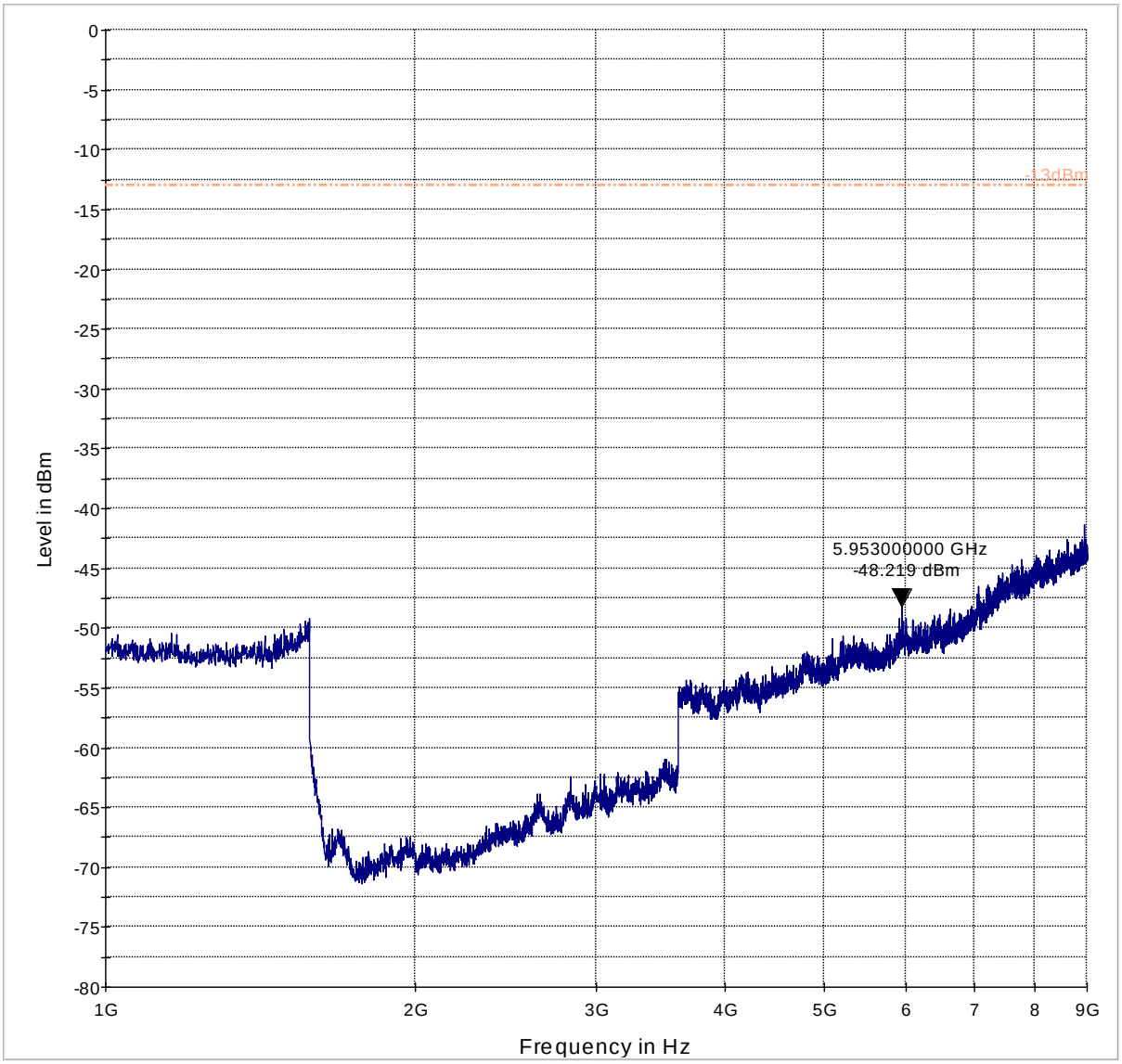
6.10.2 **GSM-850 Tx Low Channel 30MHz-1GHz external antenna trace**



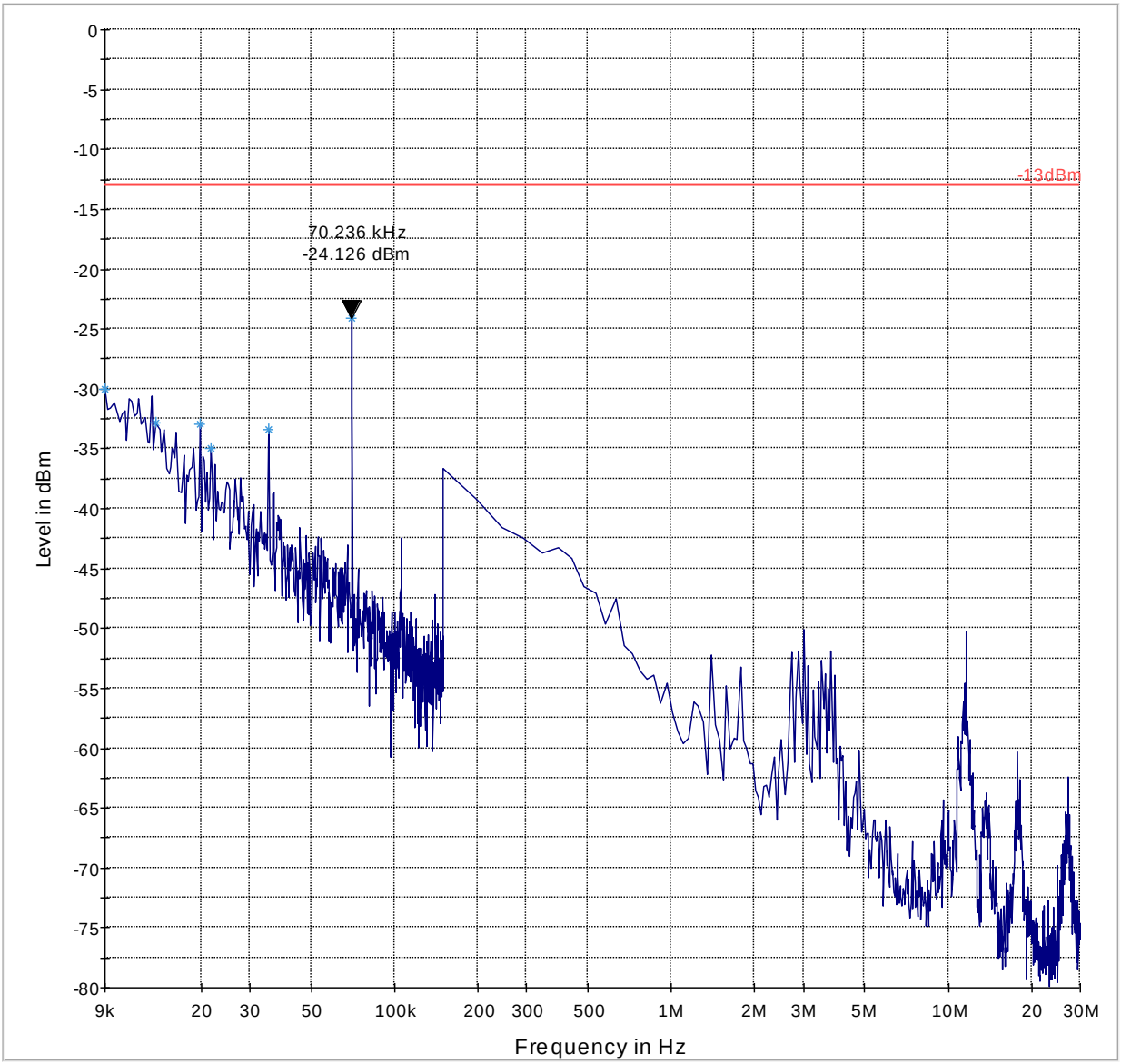
6.10.3 **GSM-850 Tx Low Channel 1GHz-9GHz internal antenna trace**



6.10.4 **GSM-850 Tx Low Channel 1GHz-9GHz external antenna trace**

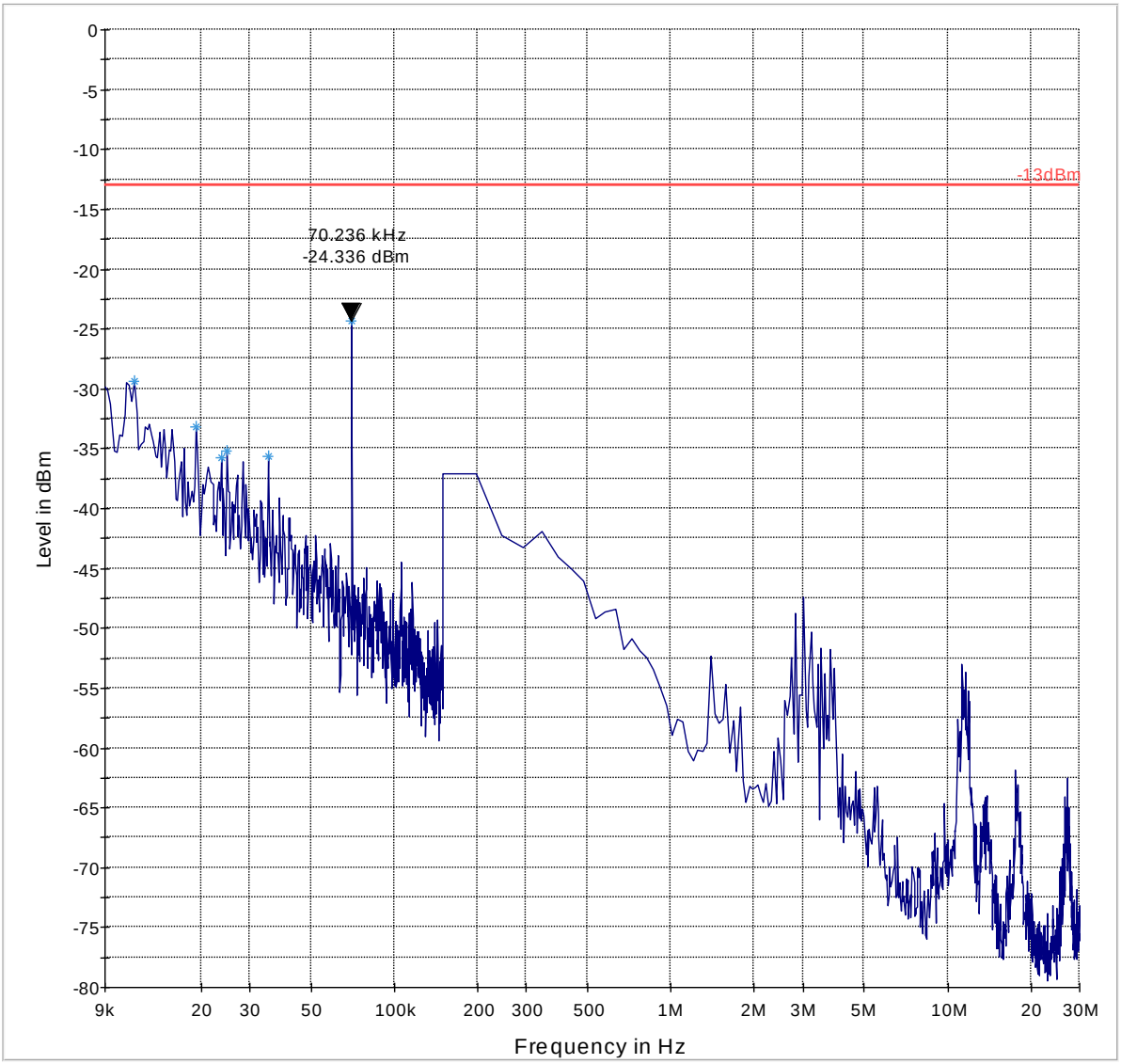


6.10.5 **GSM-850 Tx Mid Channel 9kHz-30MHz internal antenna trace**

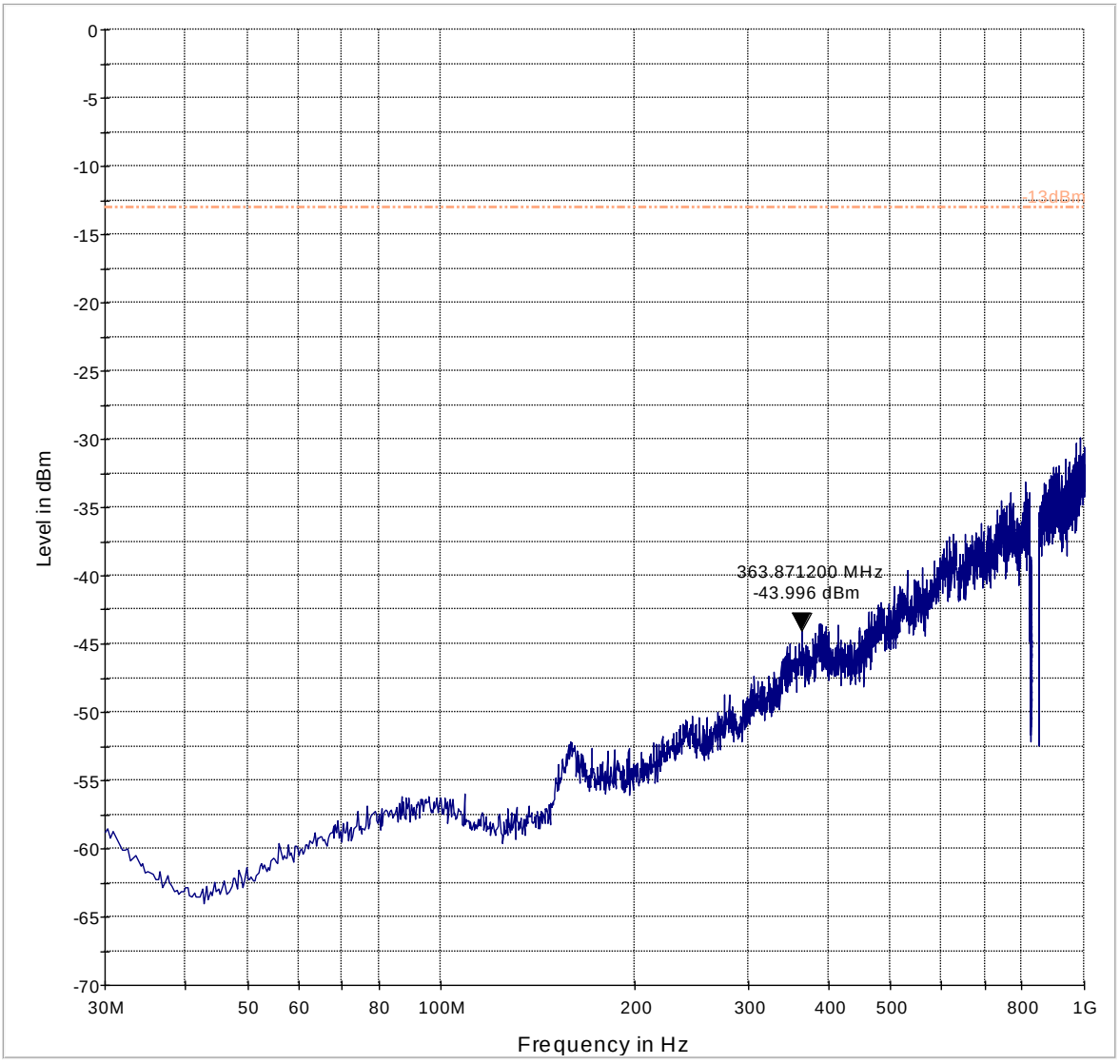


Note: The 70.236 KHz is an ambient from lights

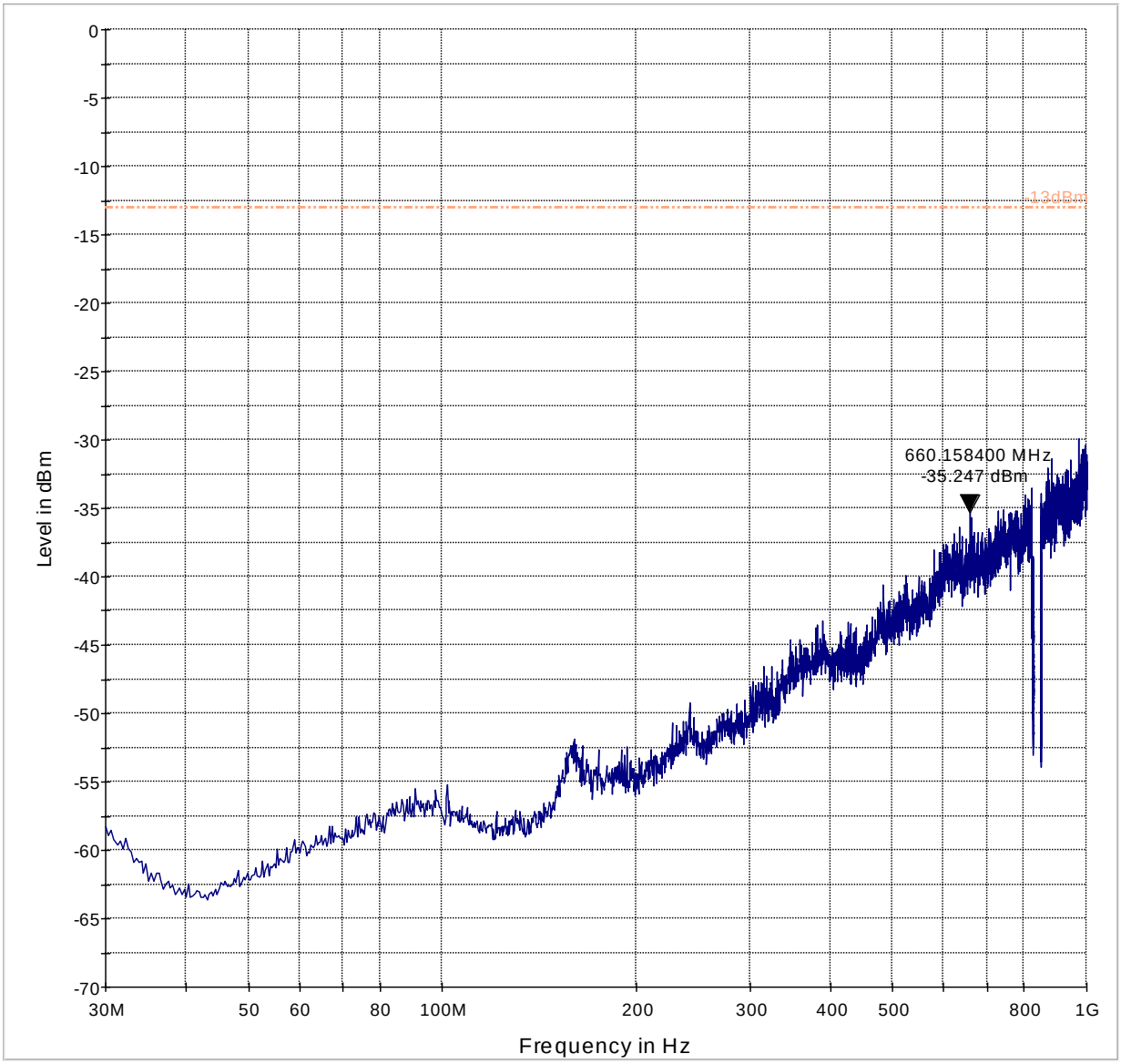
6.10.6 **GSM-850 Tx Mid Channel 9kHz-30MHz external antenna trace**



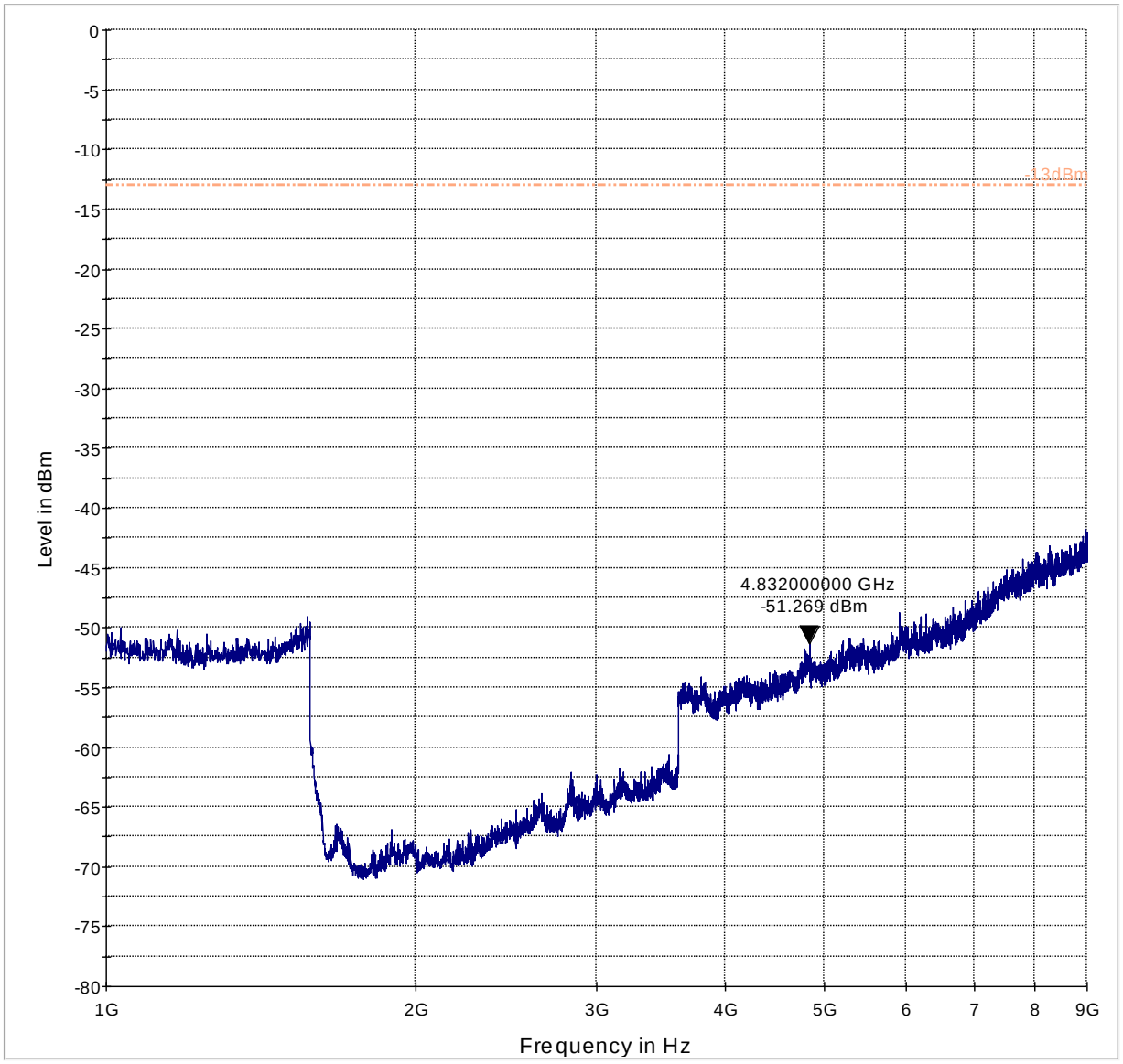
6.10.7 **GSM-850 Tx Mid Channel 30MHz-1GHz internal antenna trace**



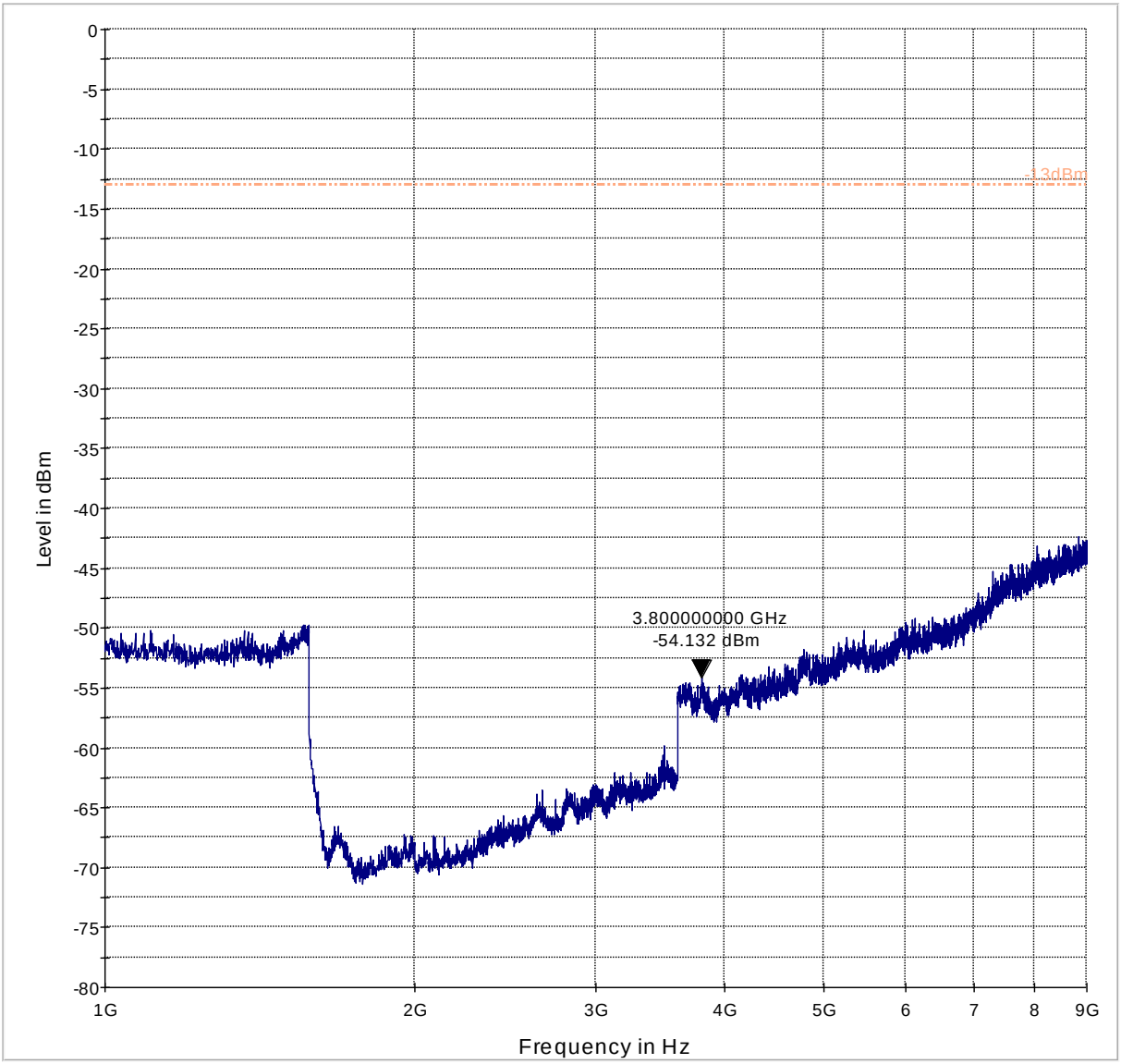
6.10.8 **GSM-850 Tx Mid Channel 30MHz-1GHz external antenna trace**



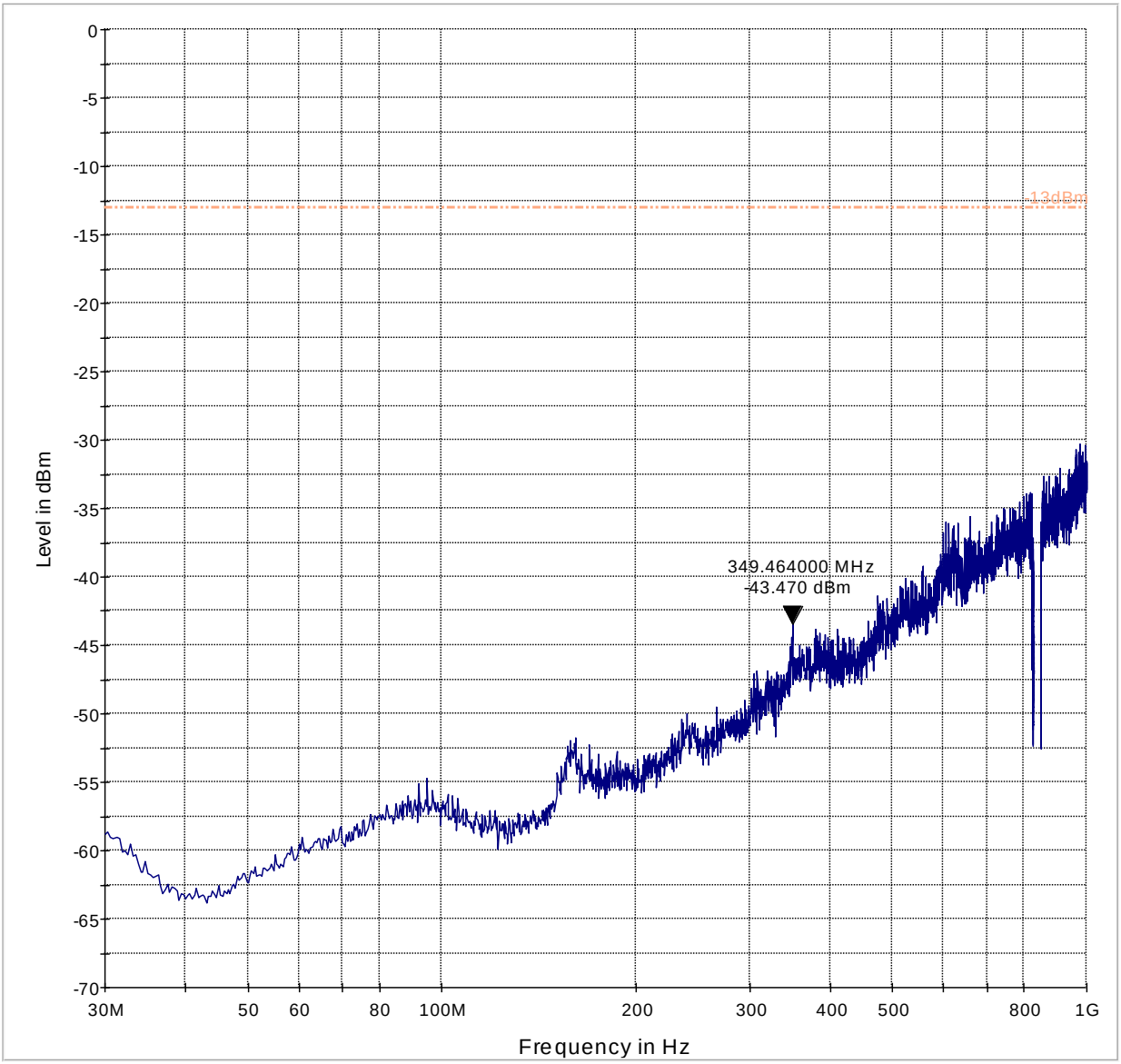
6.10.9 **GSM-850 Tx Mid Channel 1GHz-9GHz internal antenna trace**



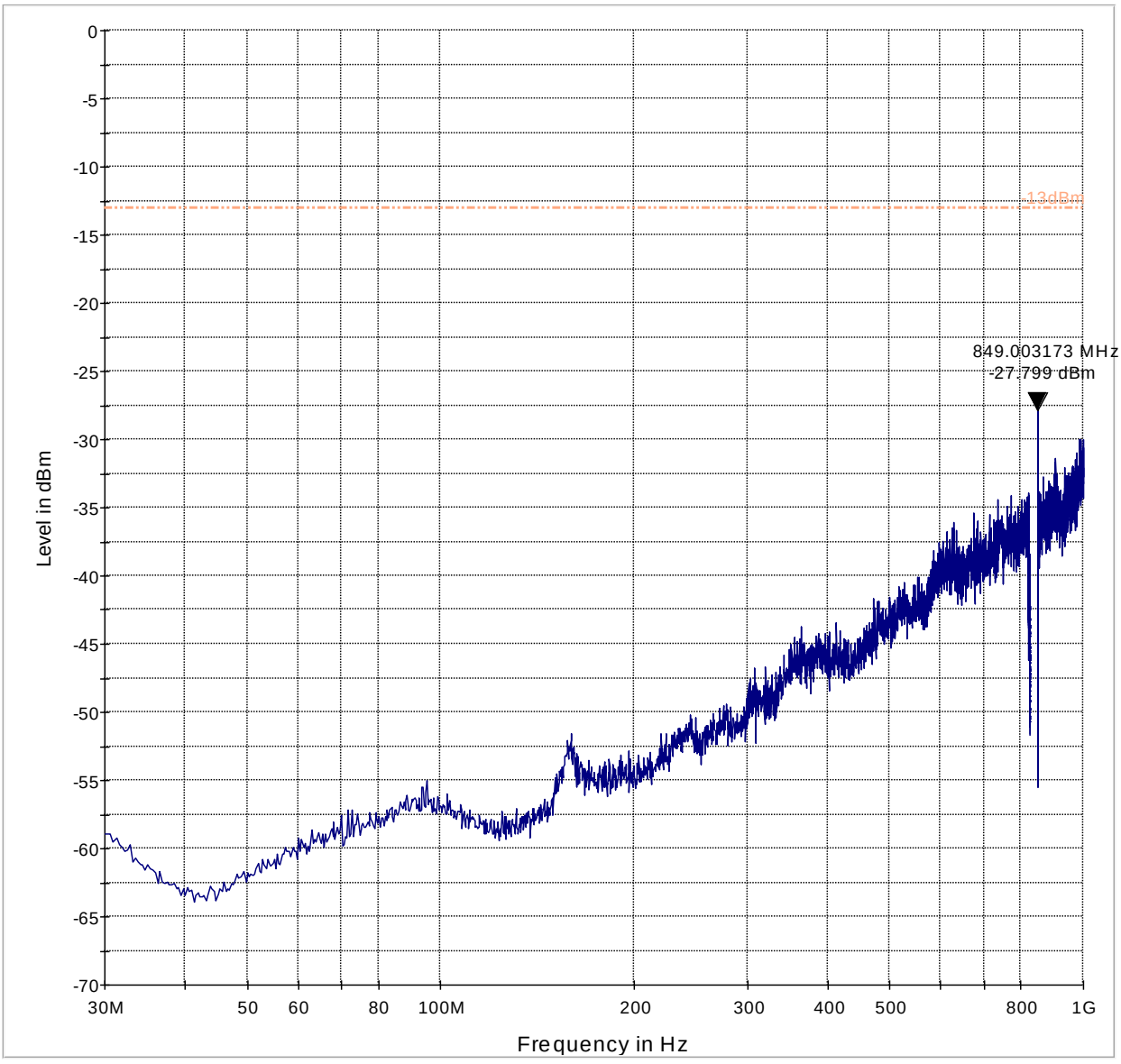
6.10.10 **GSM-850 Tx Mid Channel 1GHz-9GHz external antenna trace**



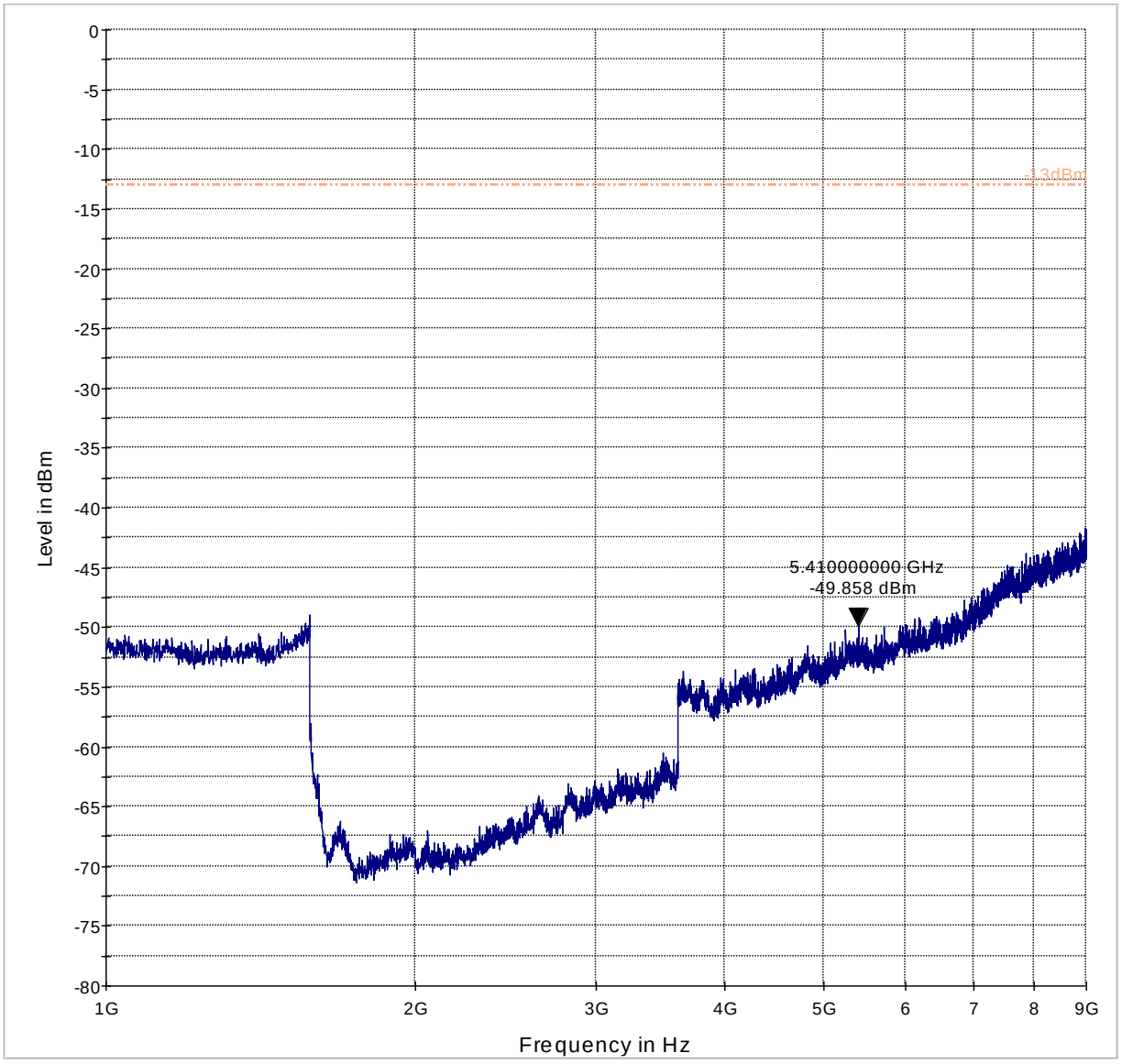
6.10.11 GSM-850 Tx High Channel 30MHz-1GHz internal antenna trace



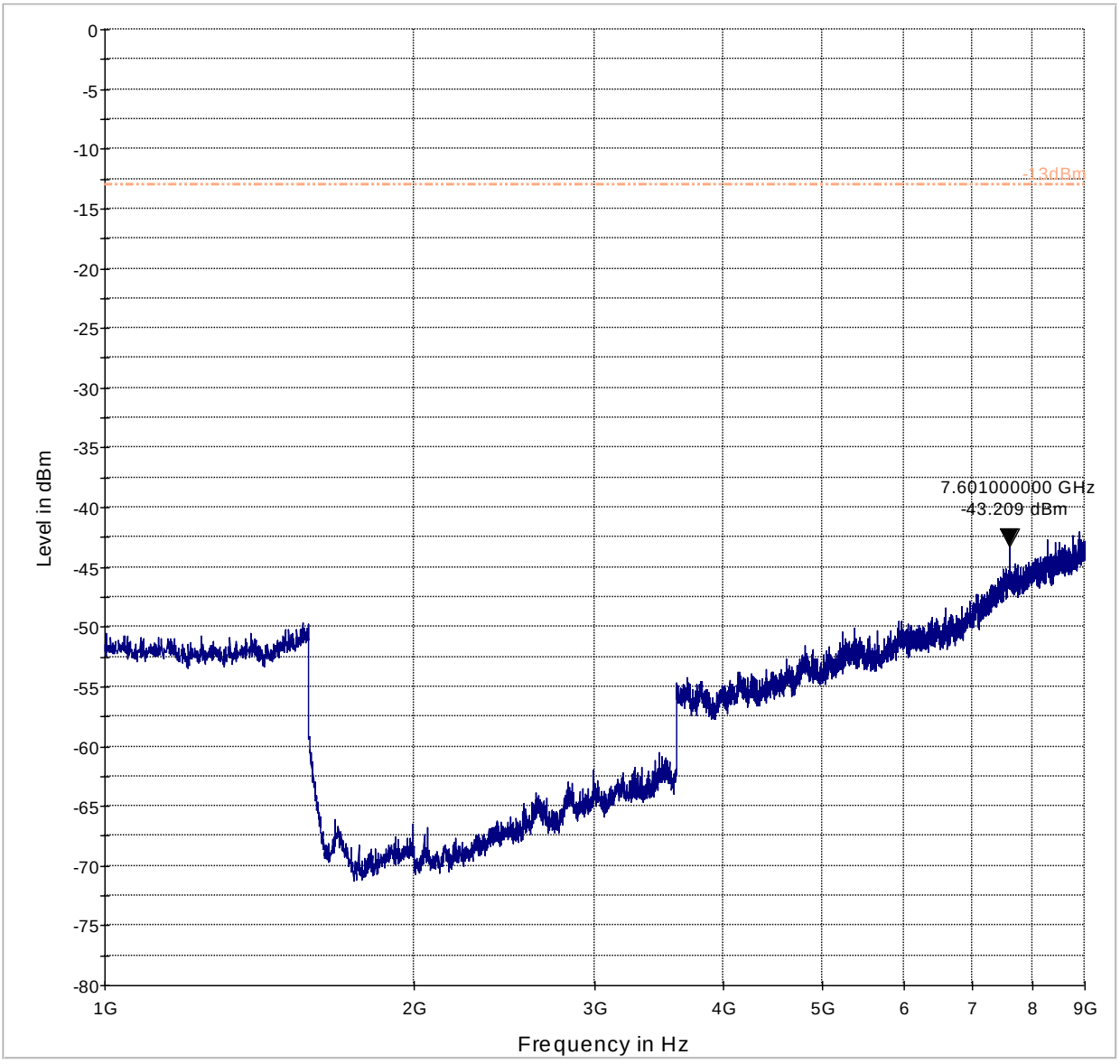
6.10.12 **GSM-850 Tx High Channel 30MHz-1GHz external antenna trace**



6.10.13 **GSM-850 Tx High Channel 1GHz-9GHz internal antenna trace**

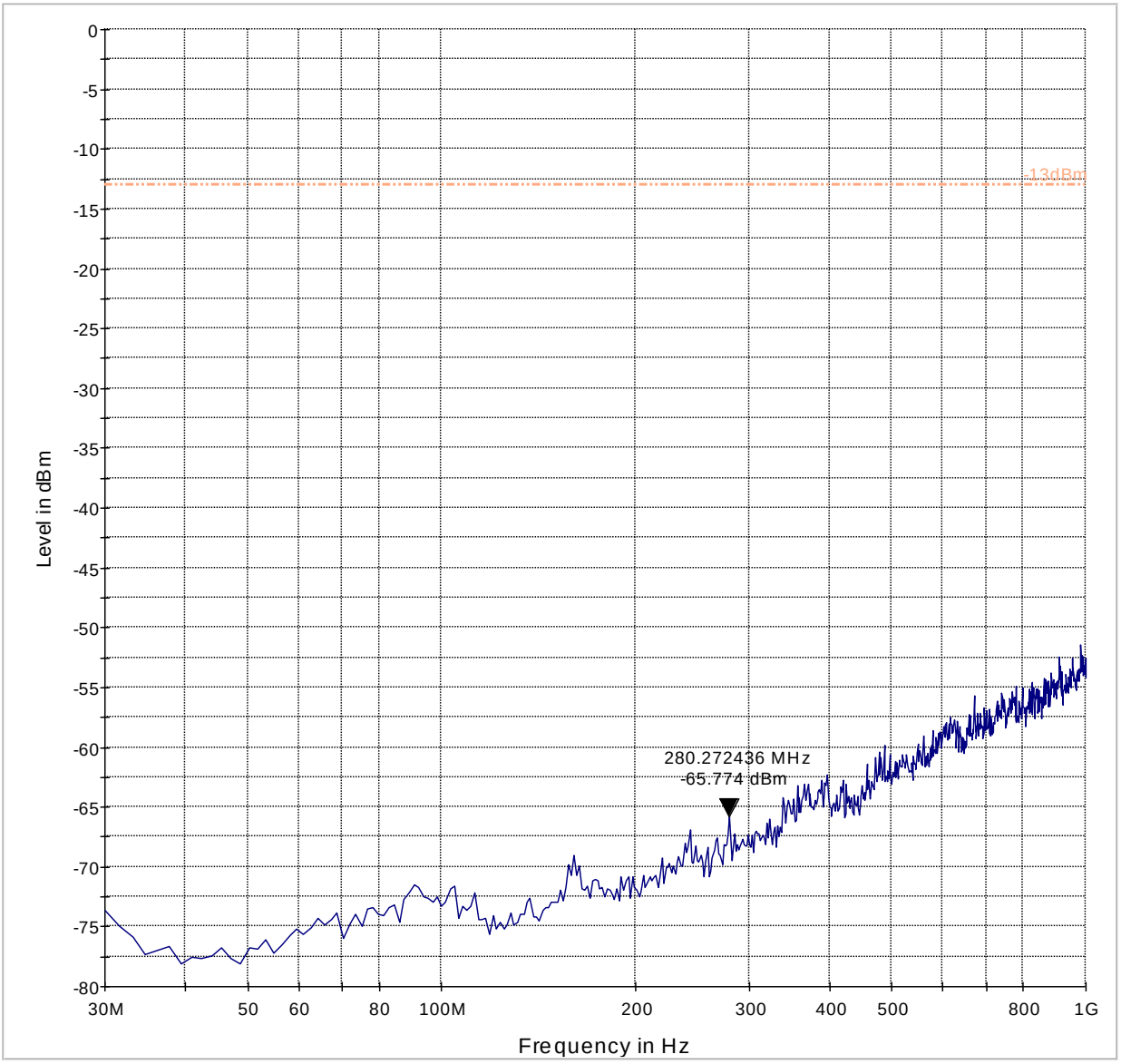


6.10.14 GSM-850 Tx High Channel 1GHz-9GHz external antenna trace

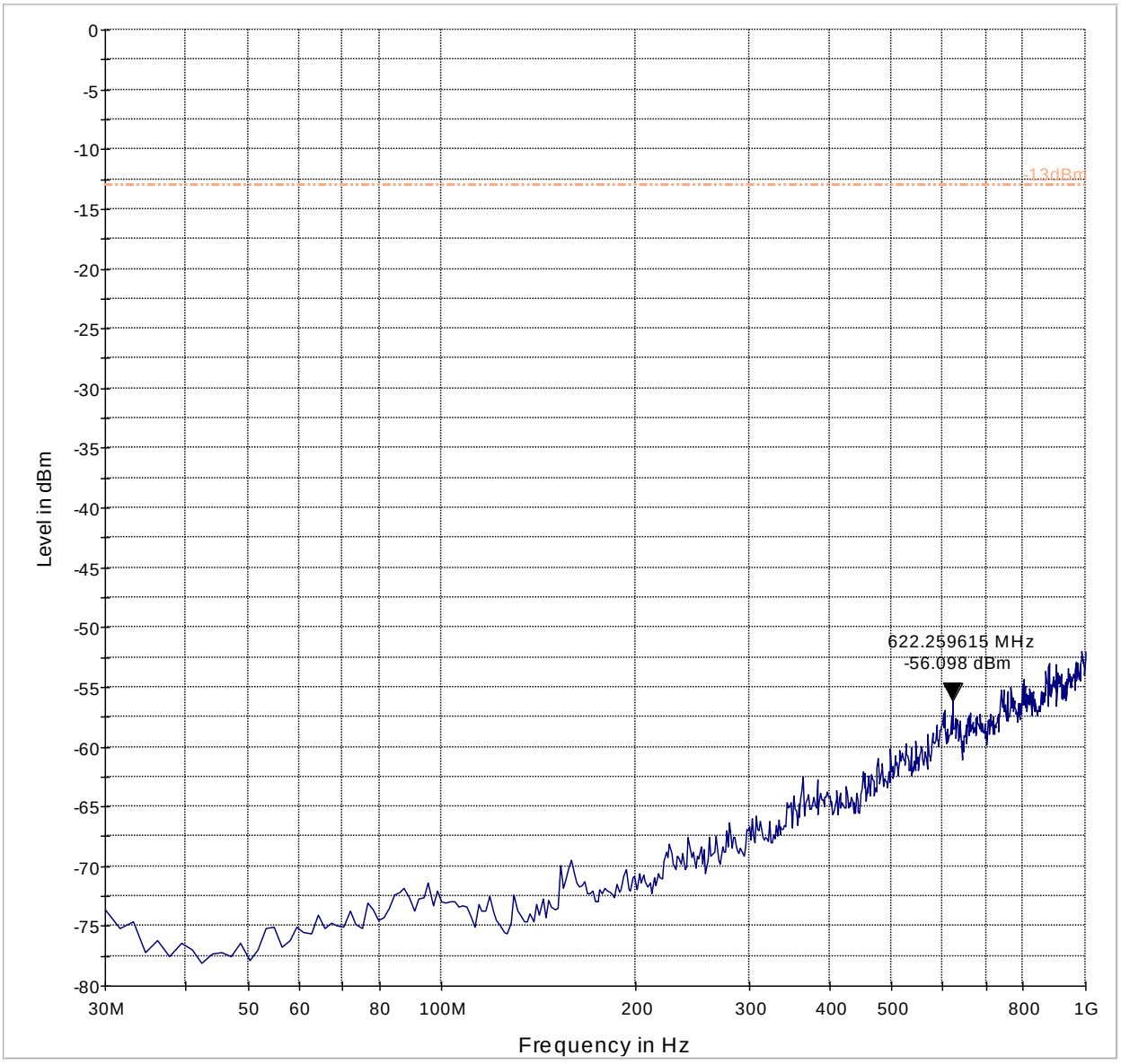


6.11 Radiated Emission Plots GSM 1900

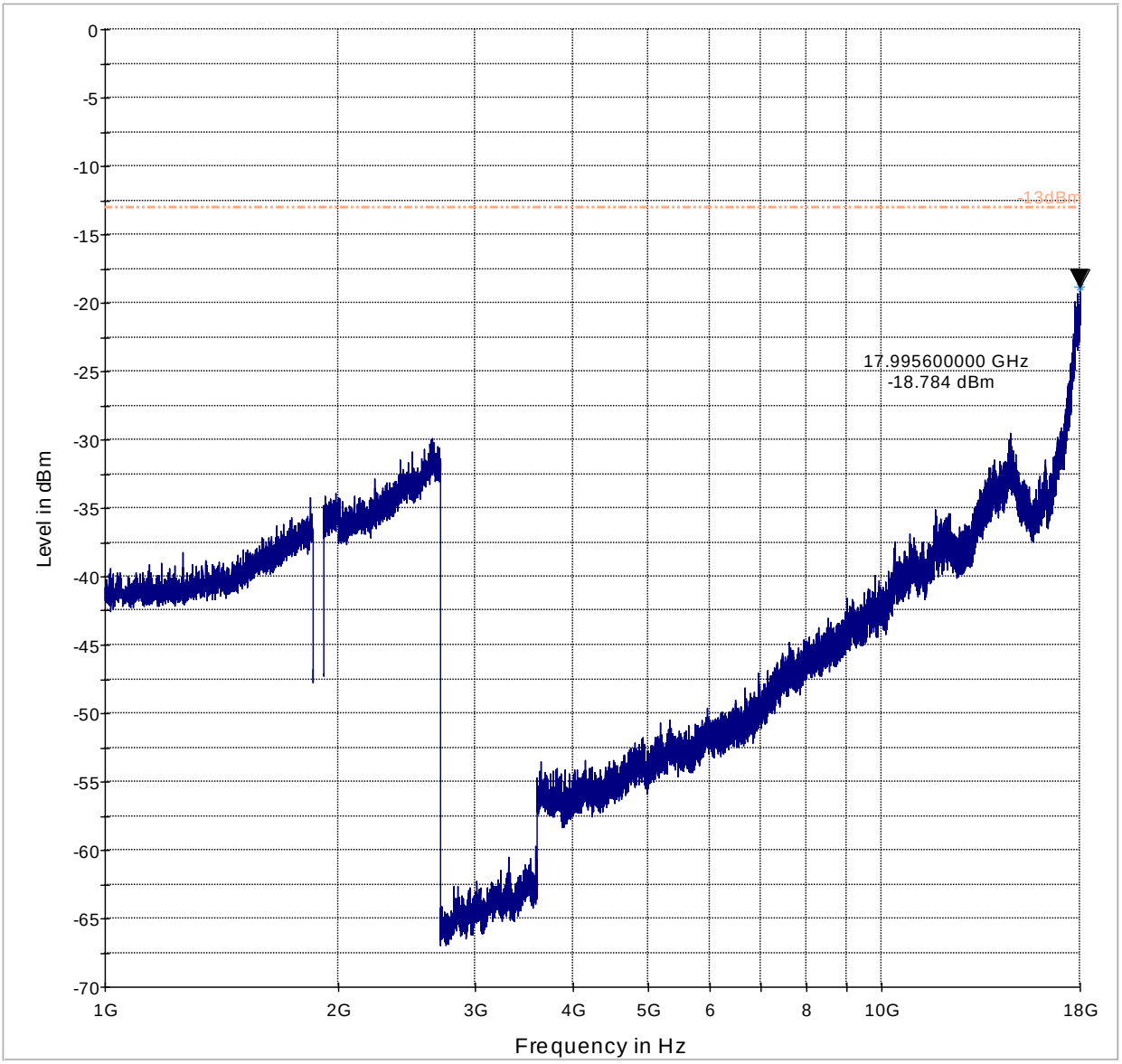
6.11.1 GSM-1900 Tx Low Channel 30MHz-1GHz internal antenna trace



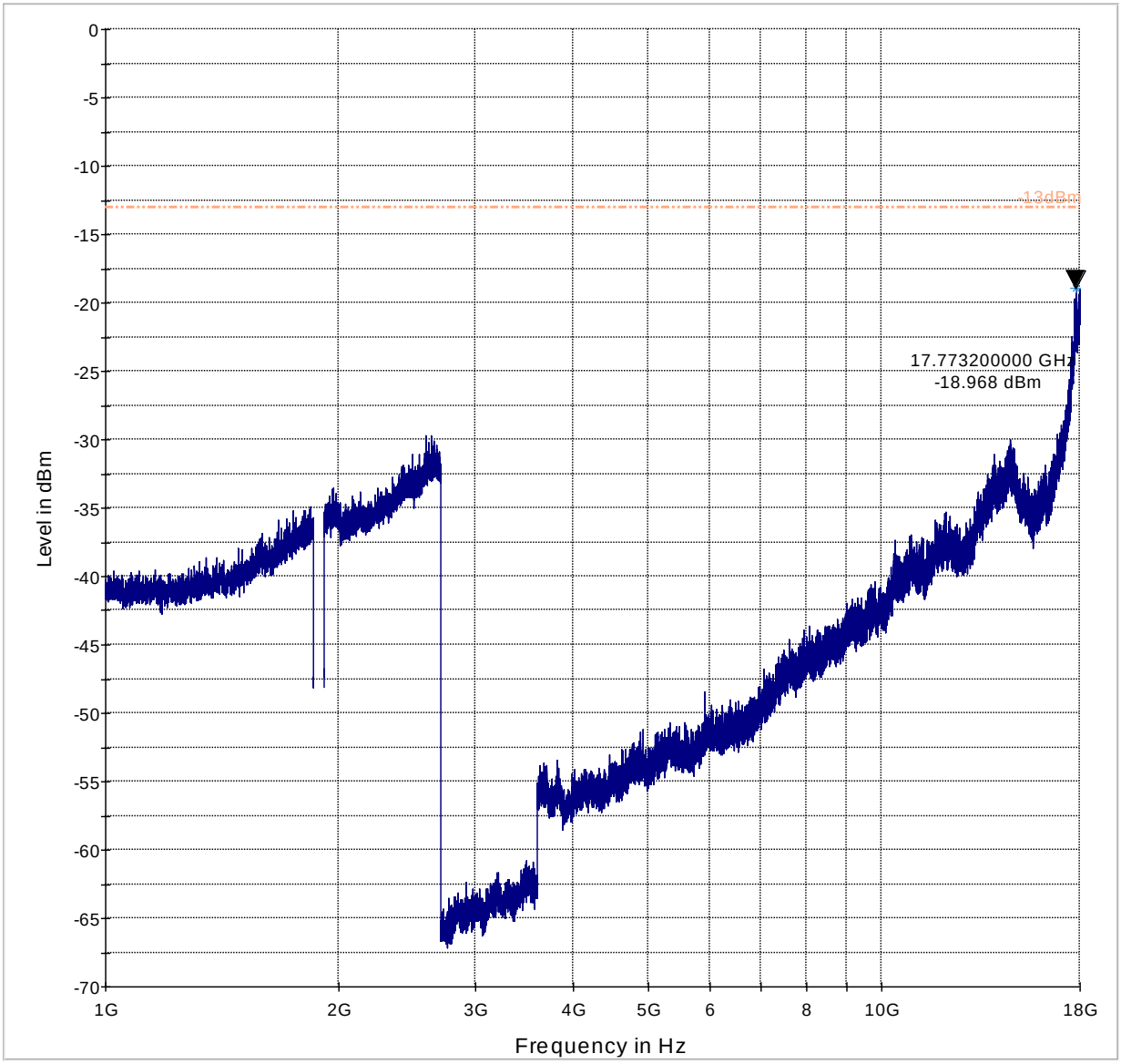
6.11.2 **GSM-1900 Tx Low Channel 30MHz-1GHz external antenna trace**



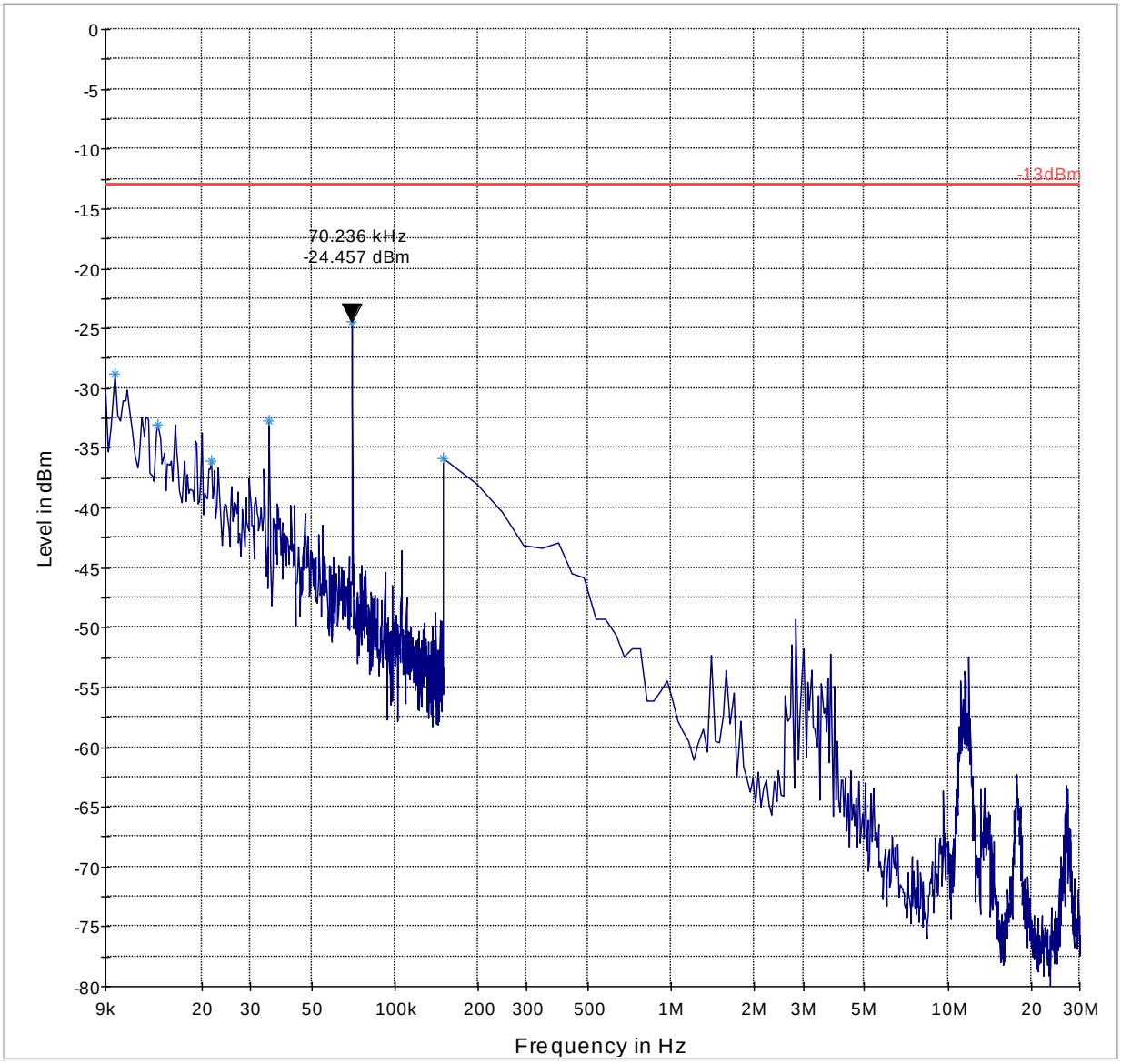
6.11.3 **GSM-1900 Tx Low Channel 1GHz-18GHz internal antenna trace**



6.11.4 **GSM-1900 Tx Low Channel 1GHz-18GHz external antenna trace**

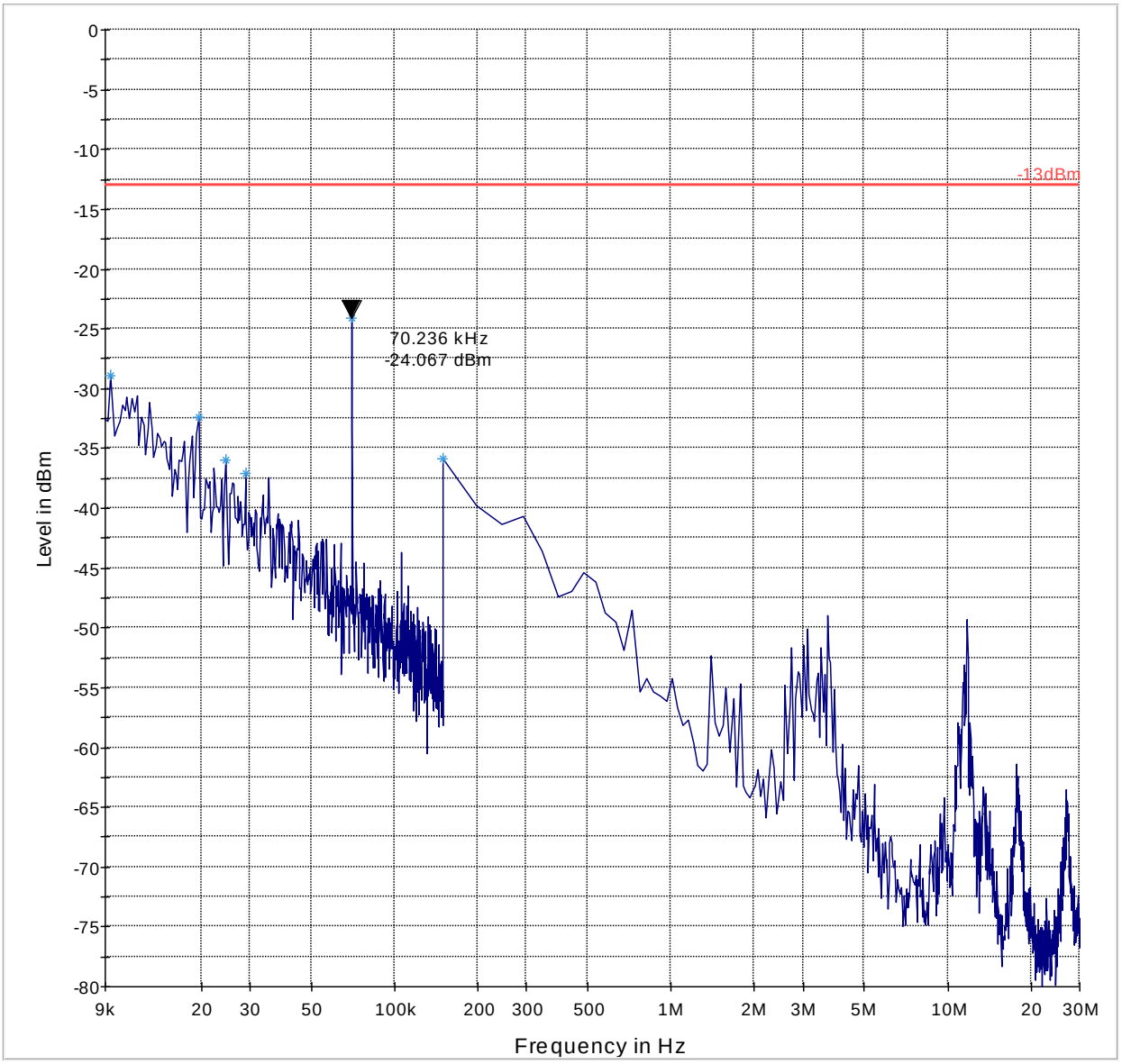


6.11.5 GSM-1900 Tx Mid Channel 9KHz - 30MH internal antenna trace



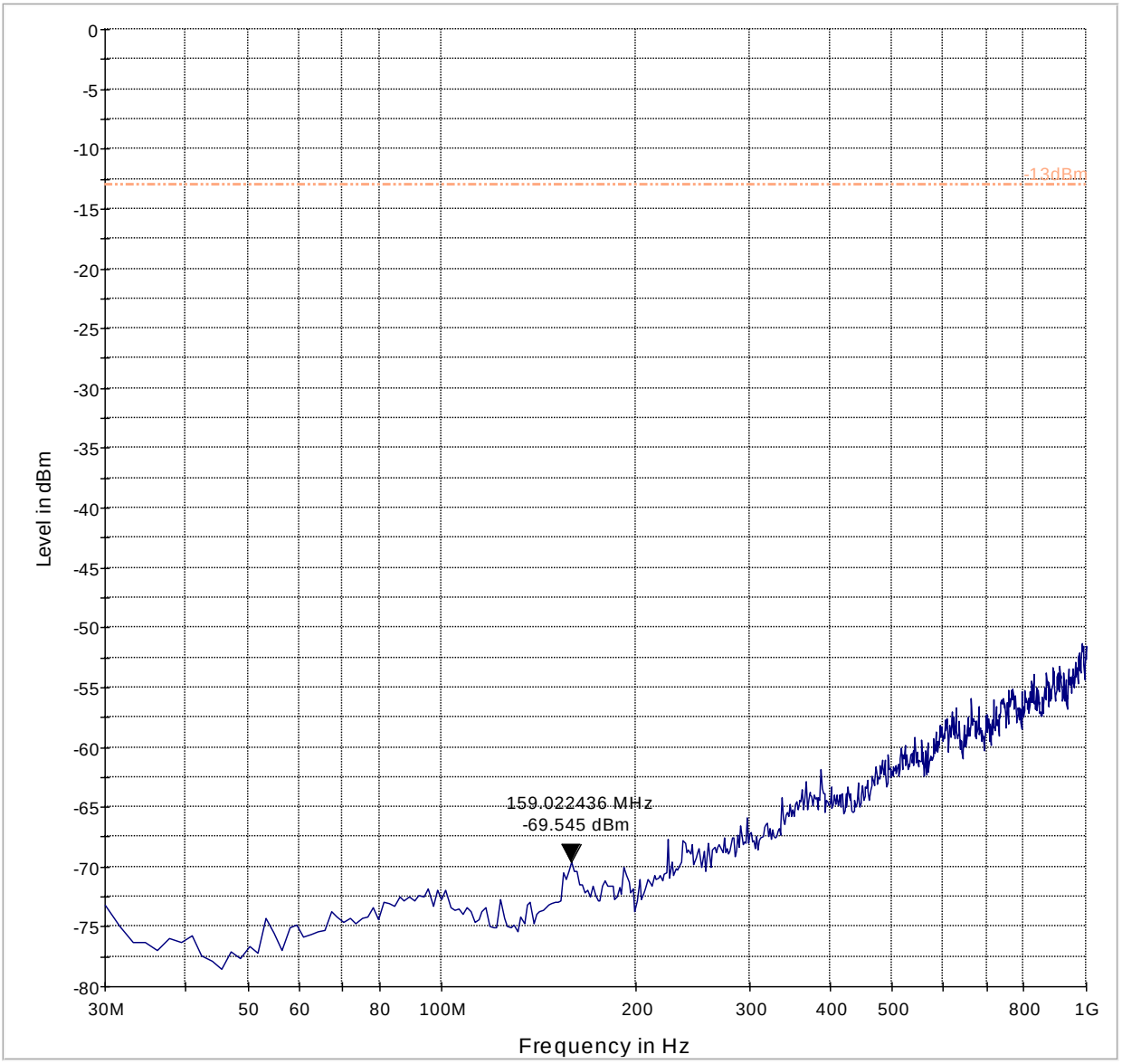
Note: The 70.236 KHz is an ambient from lights

6.11.6 **GSM-1900 Tx Mid Channel 9KHz - 30MH external antenna trace**

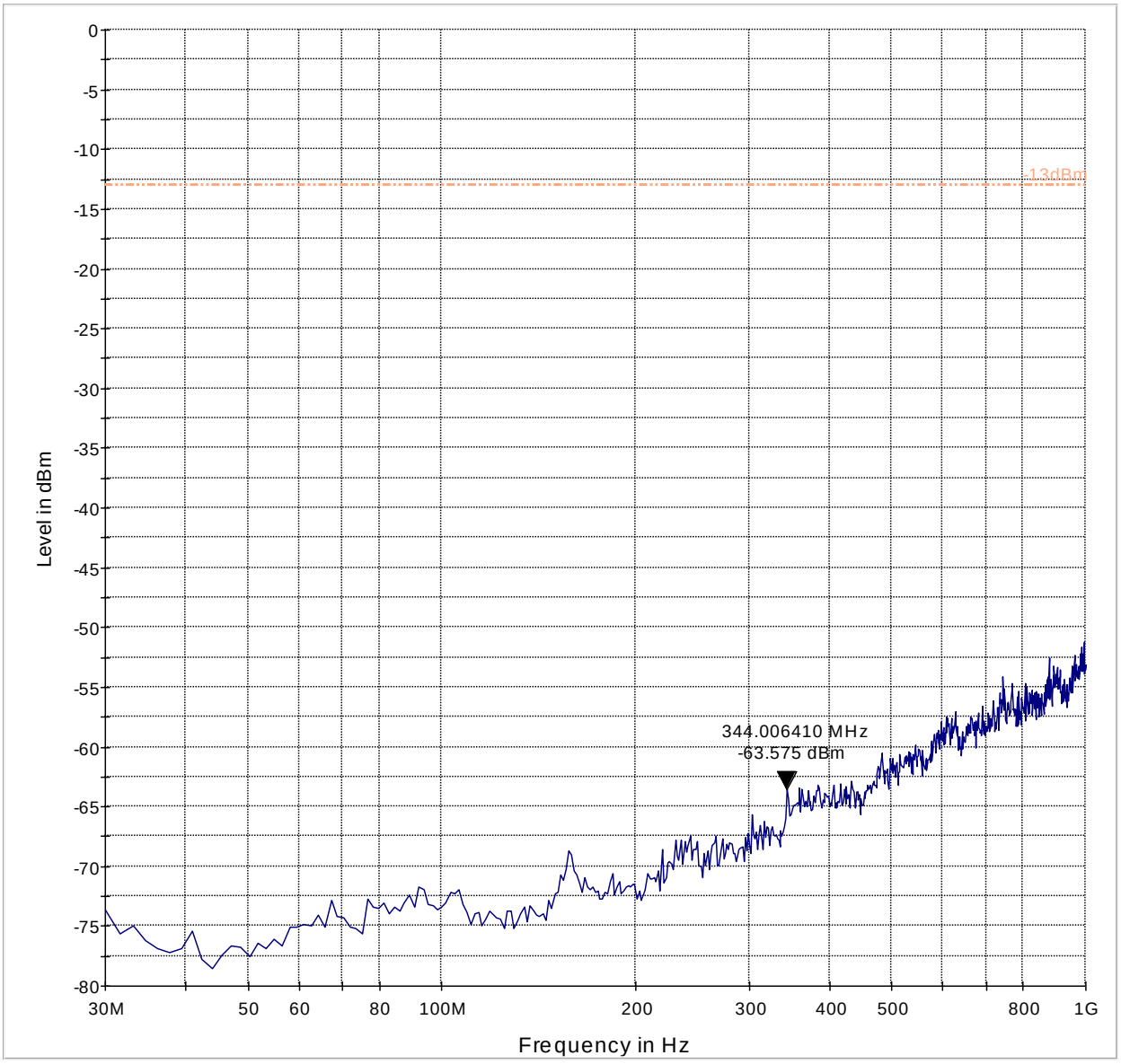


Note: The 70.236 KHz is an ambient from lights

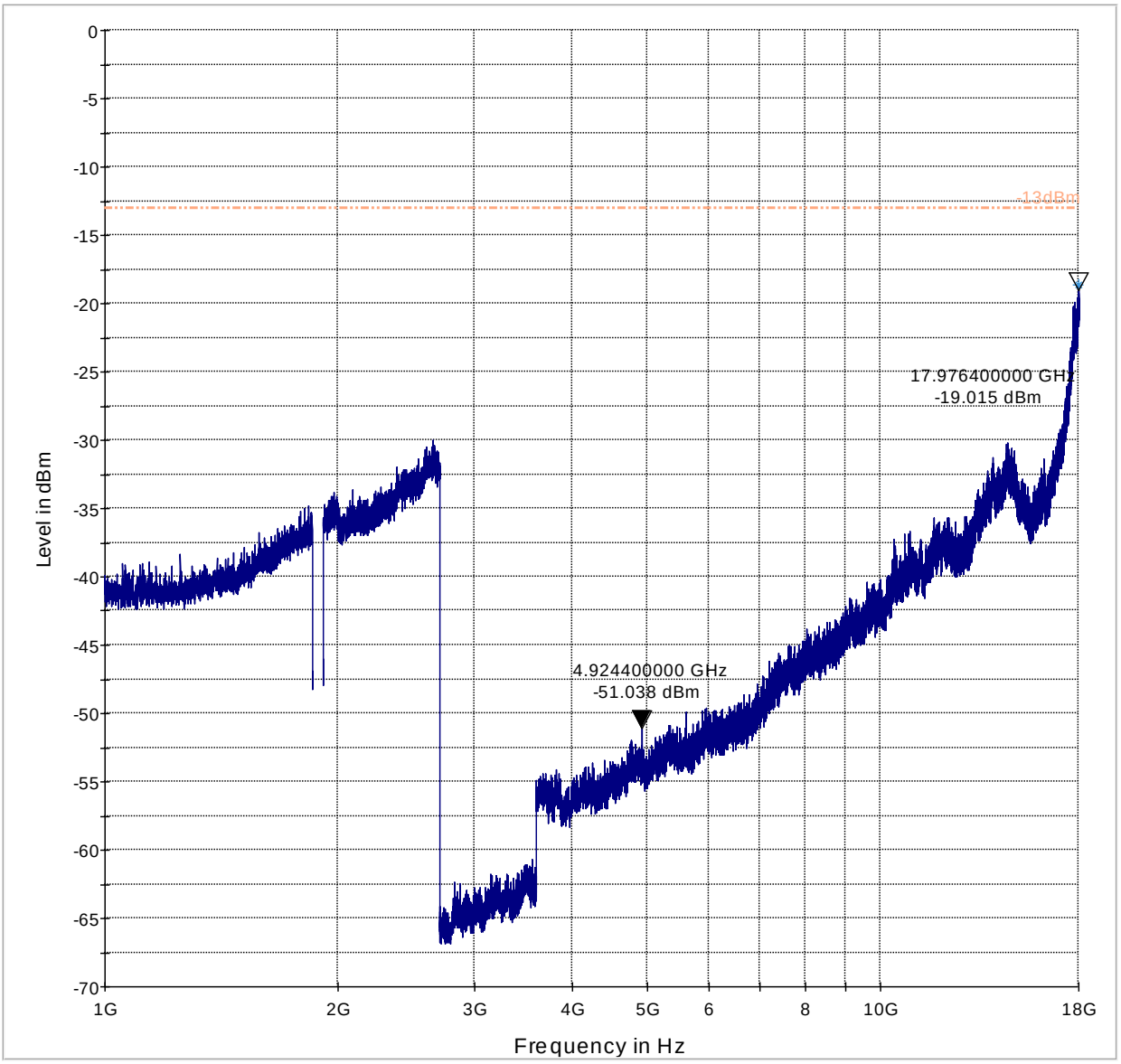
6.11.7 **GSM-1900 Tx Mid Channel 30MHz-1GHz internal antenna trace**



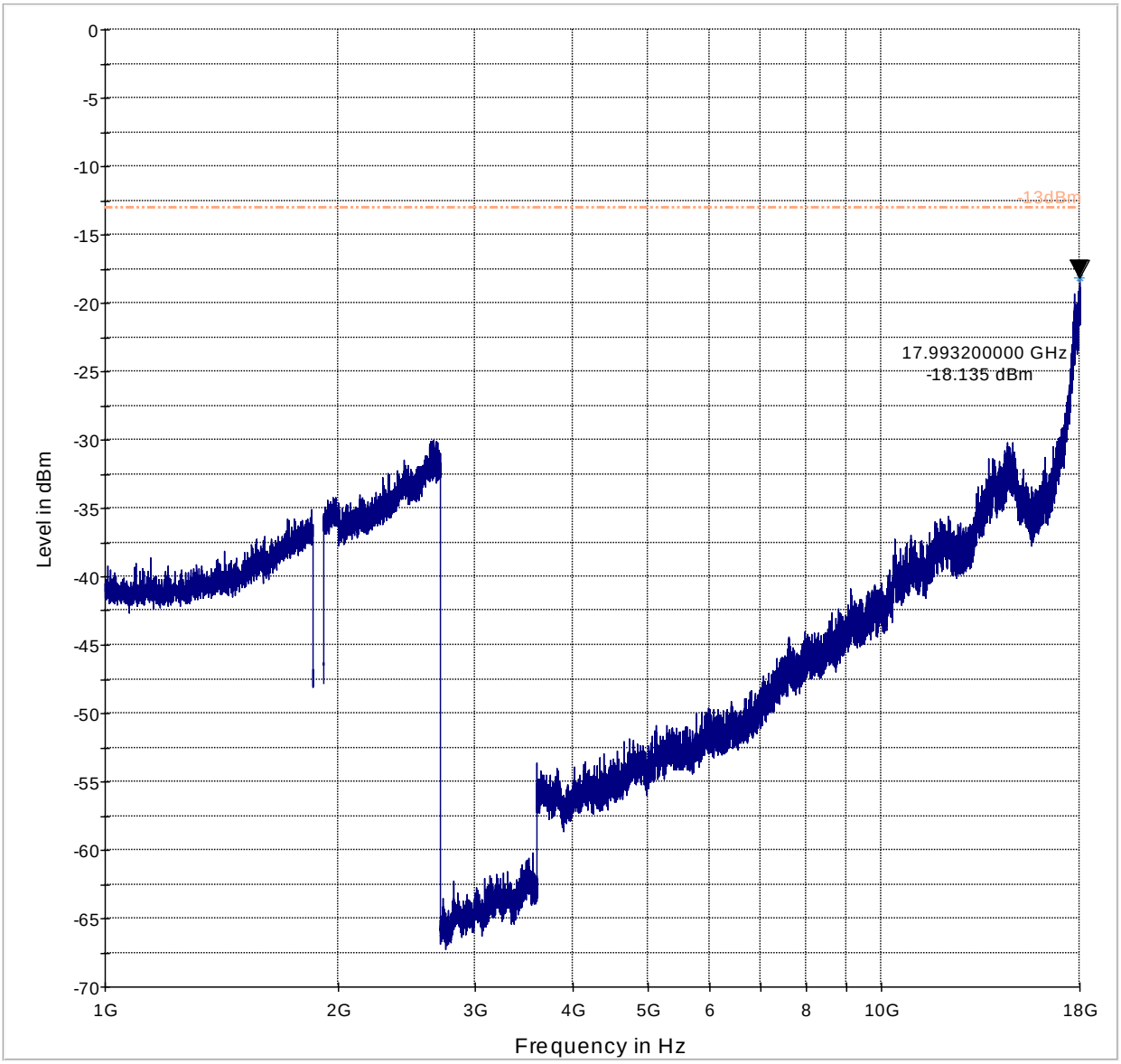
6.11.8 **GSM-1900 Tx Mid Channel 30MHz-1GHz external antenna trace**



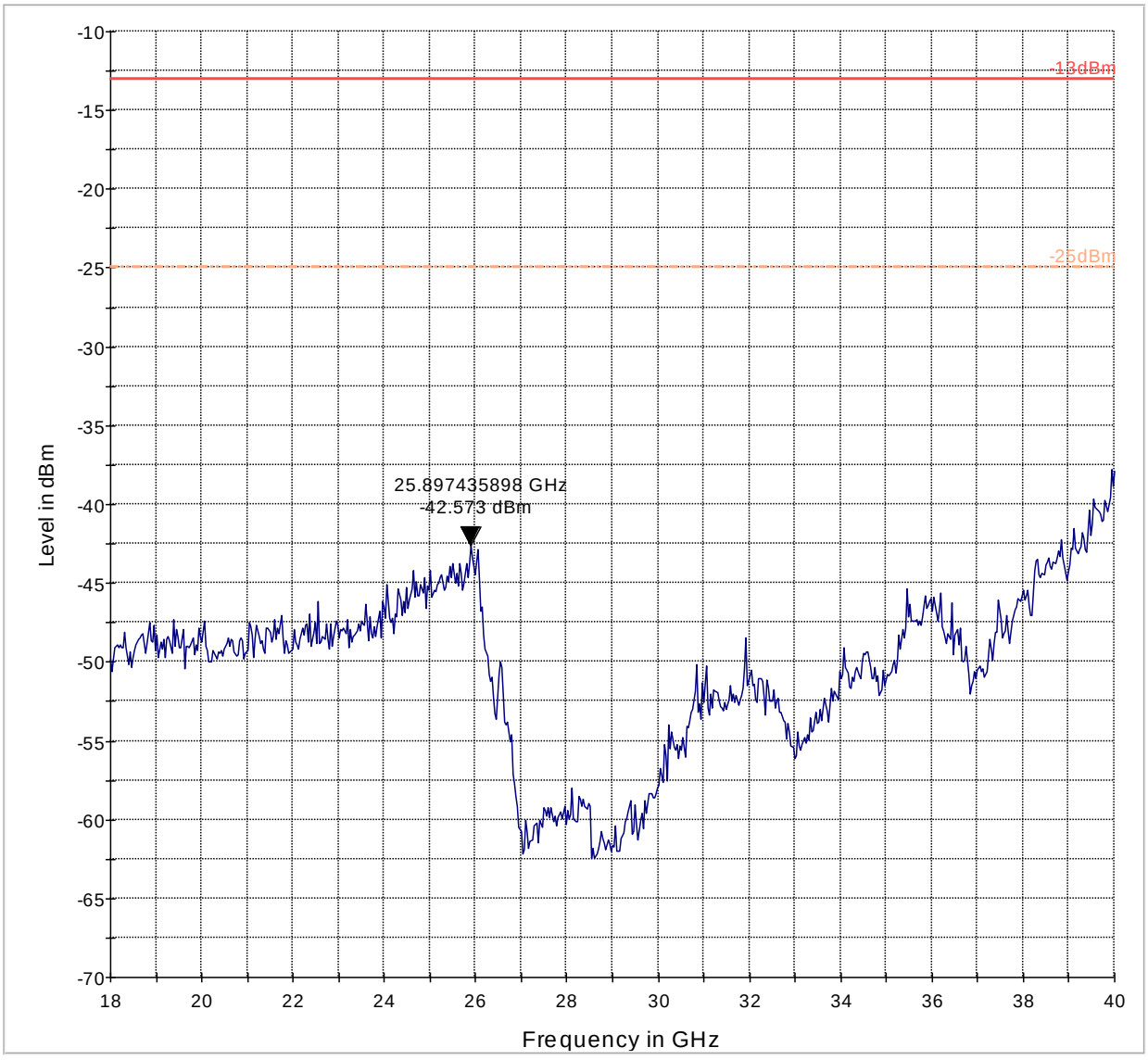
6.11.9 **GSM-1900 Tx Mid Channel 1GHz-18GHz internal antenna trace**



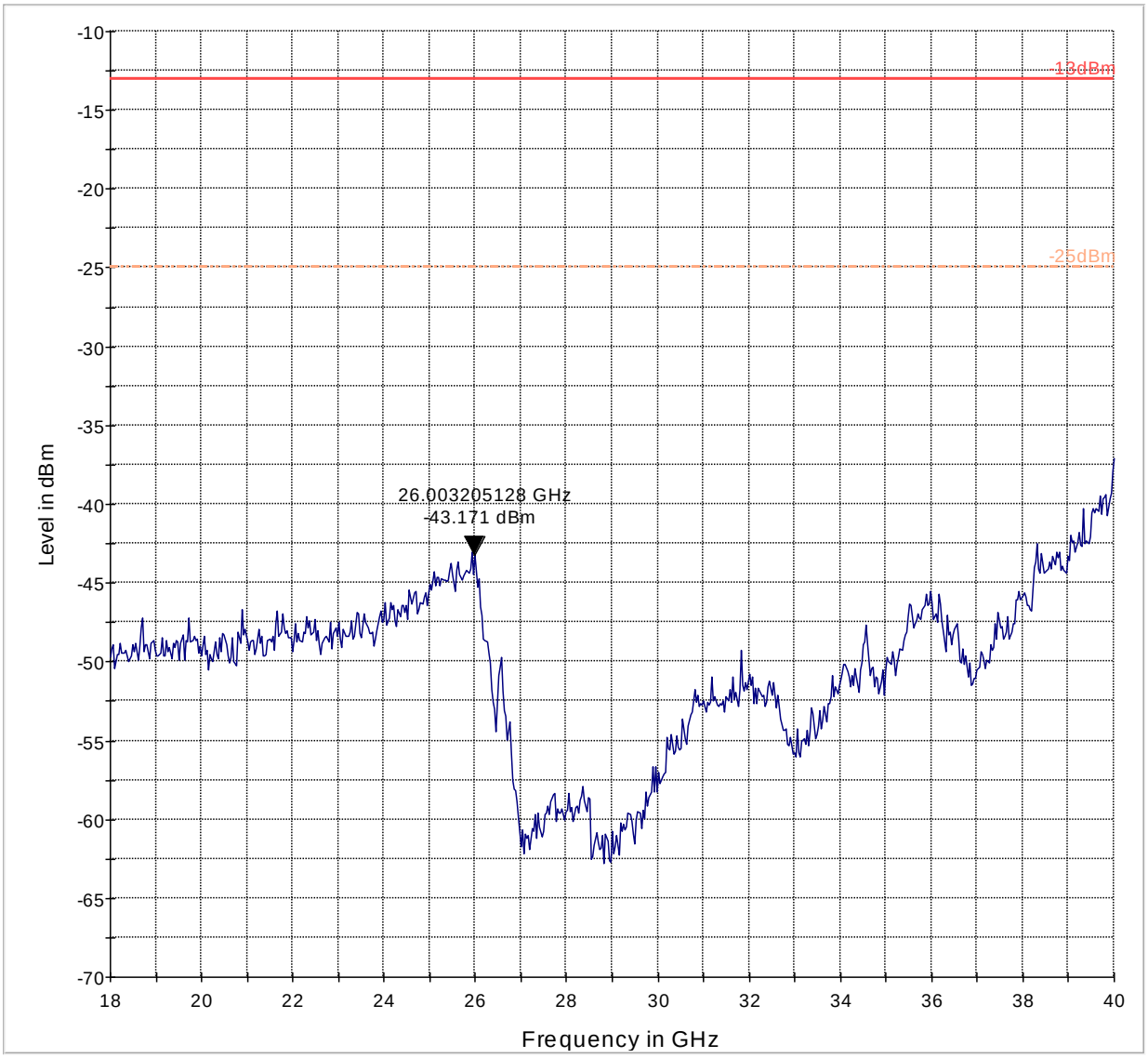
6.11.10 GSM-1900 Tx Mid Channel 1GHz-18GHz external antenna trace



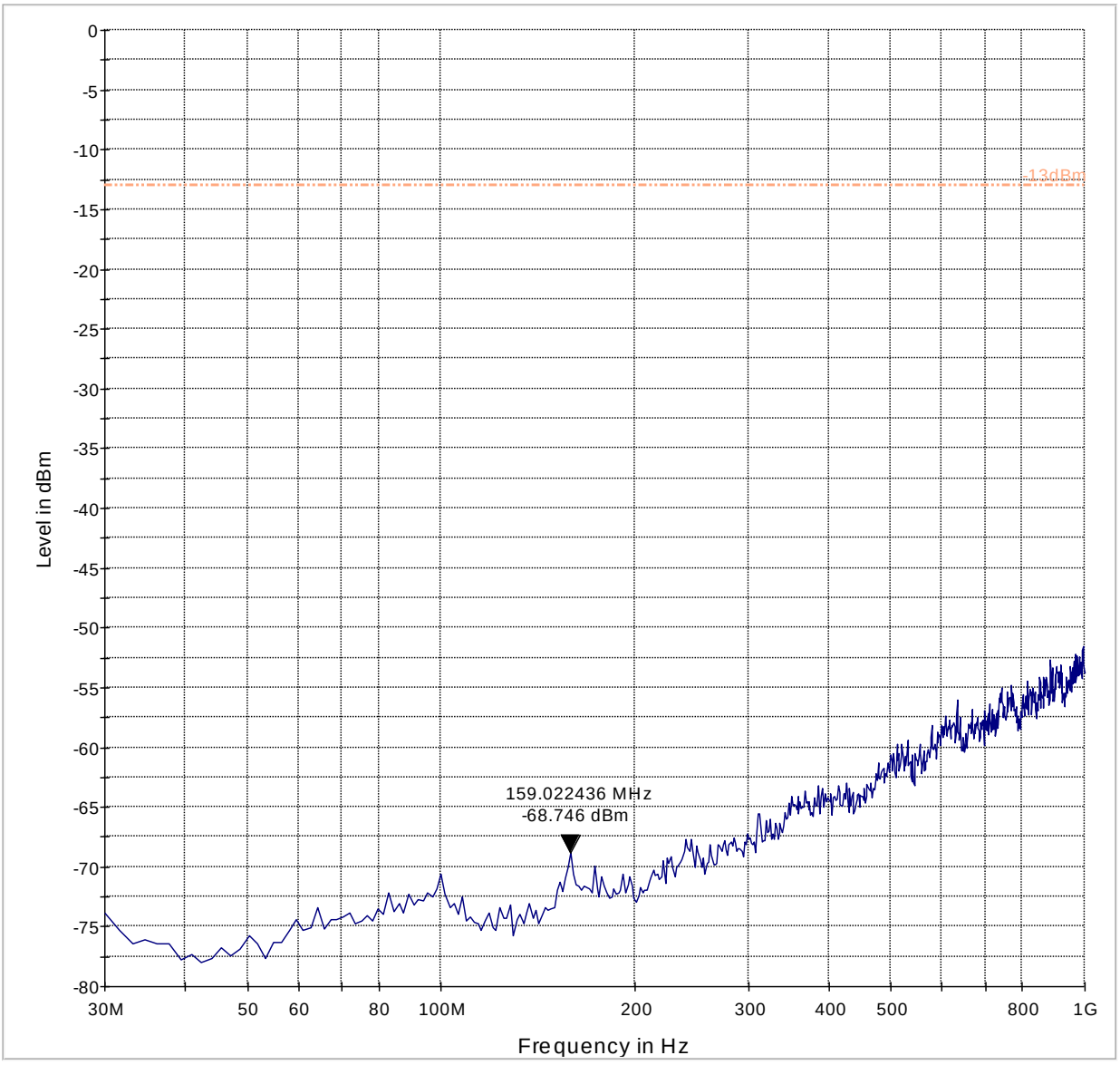
6.11.11 **GSM-1900 Tx Mid Channel 18GHz-40GHz internal antenna trace**



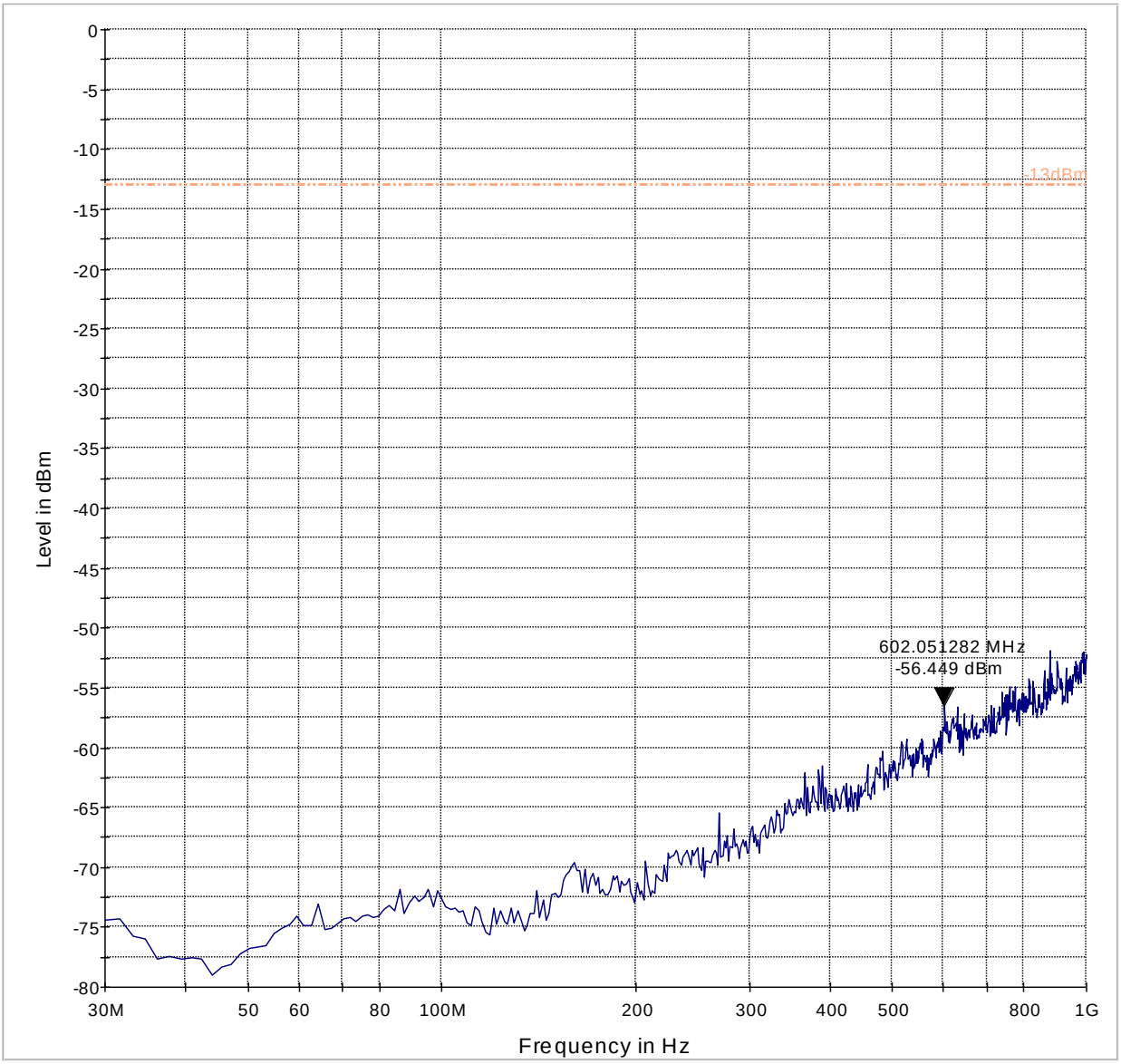
6.11.12 **GSM-1900 Tx Mid Channel 18GHz-40GHz external antenna trace**



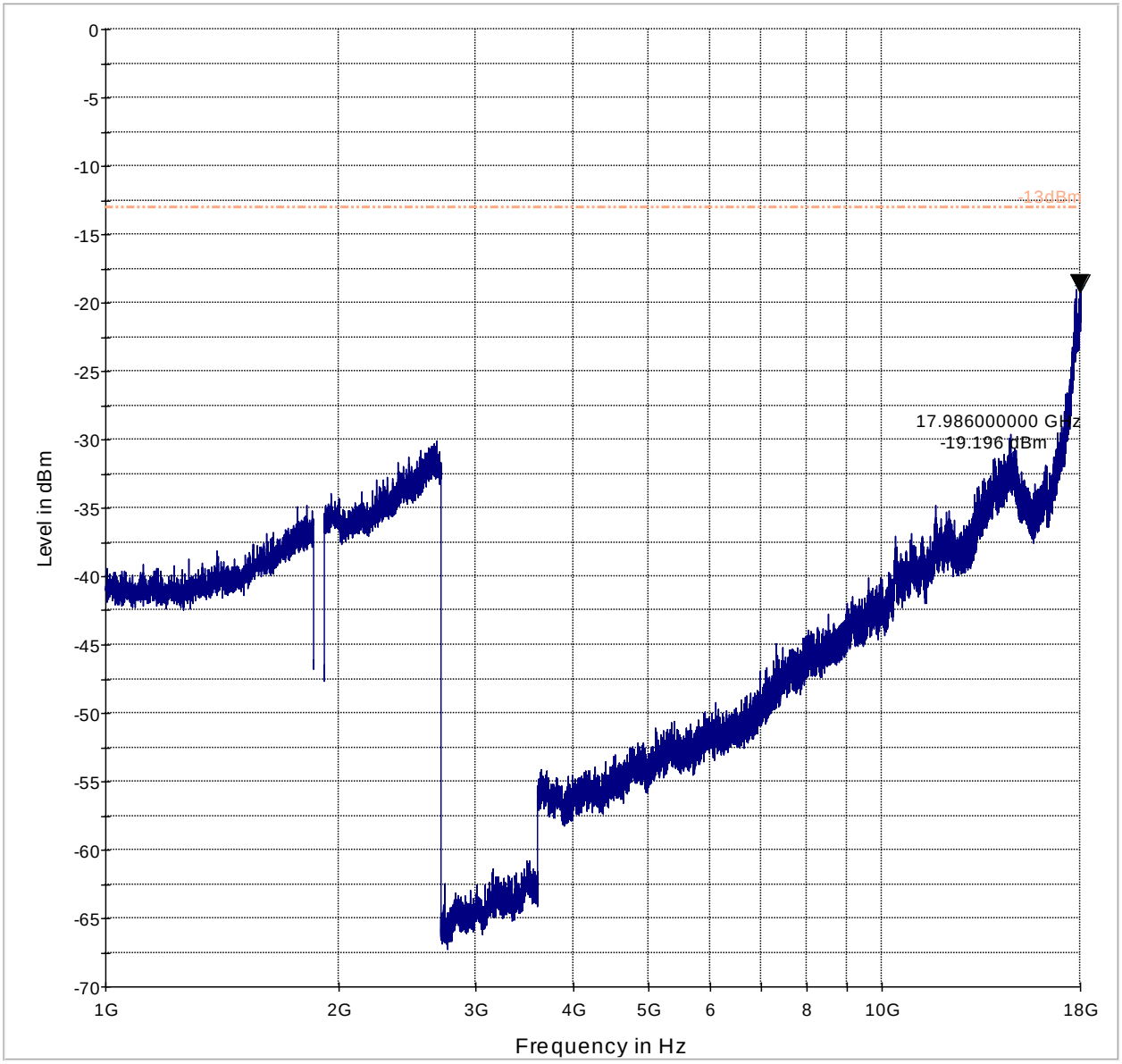
6.11.13 **GSM-1900 Tx High Channel 30MHz-1GHz internal antenna trace**



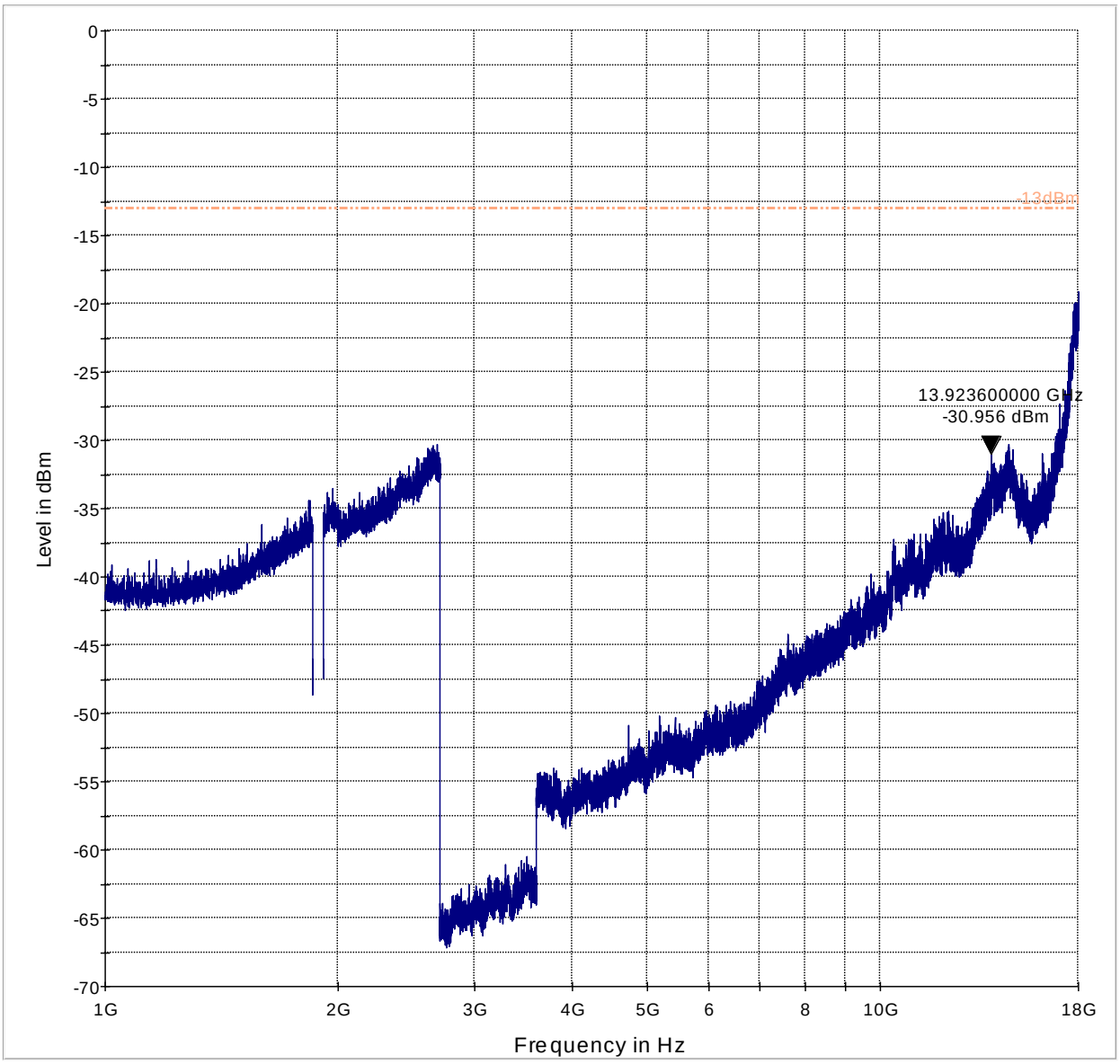
6.11.14 GSM-1900 Tx High Channel 30MHz-1GHz external antenna trace



6.11.15 **GSM-1900 Tx High 1GHz-18GHz internal antenna trace**

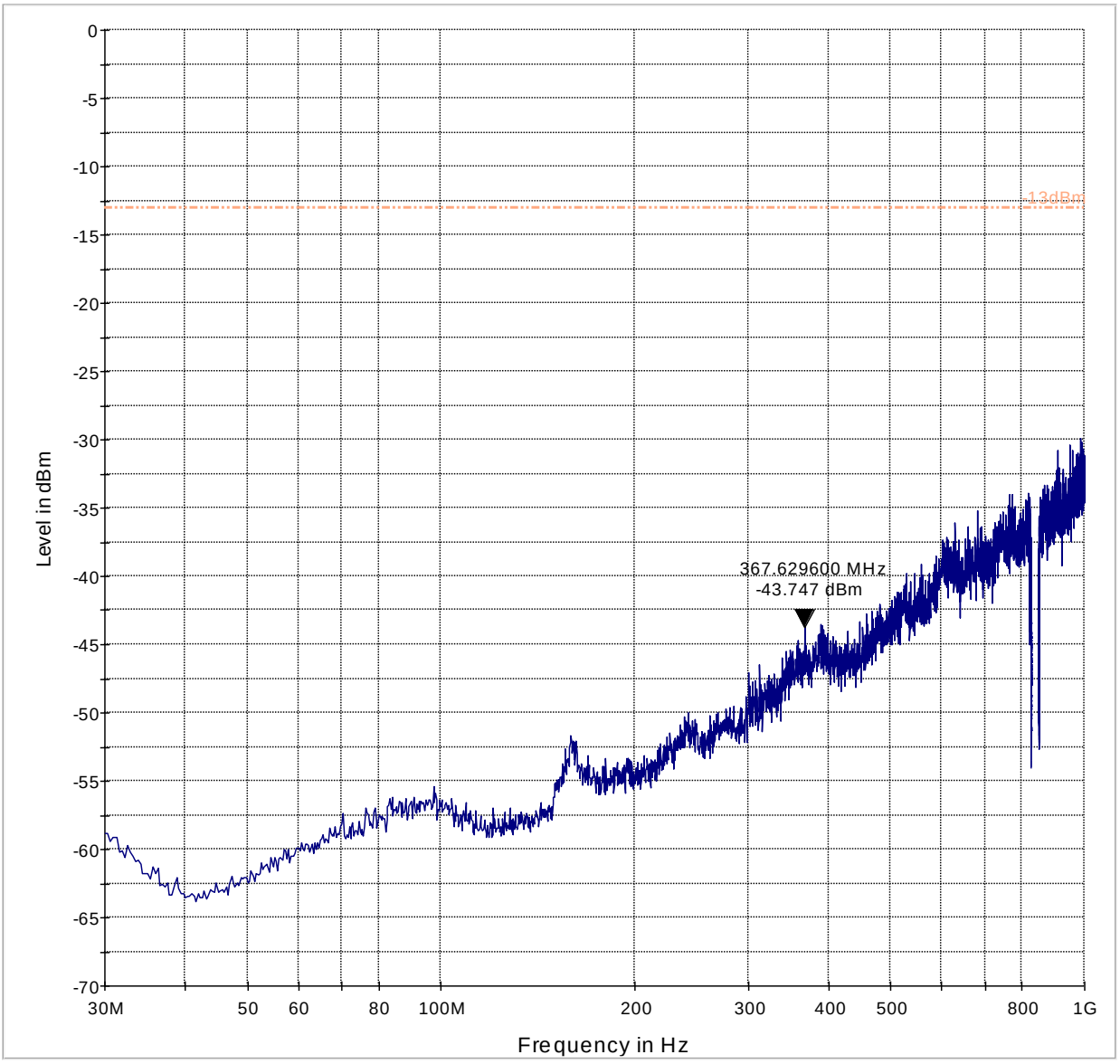


6.11.16 **GSM-1900 Tx High 1GHz-18GHz external antenna trace**

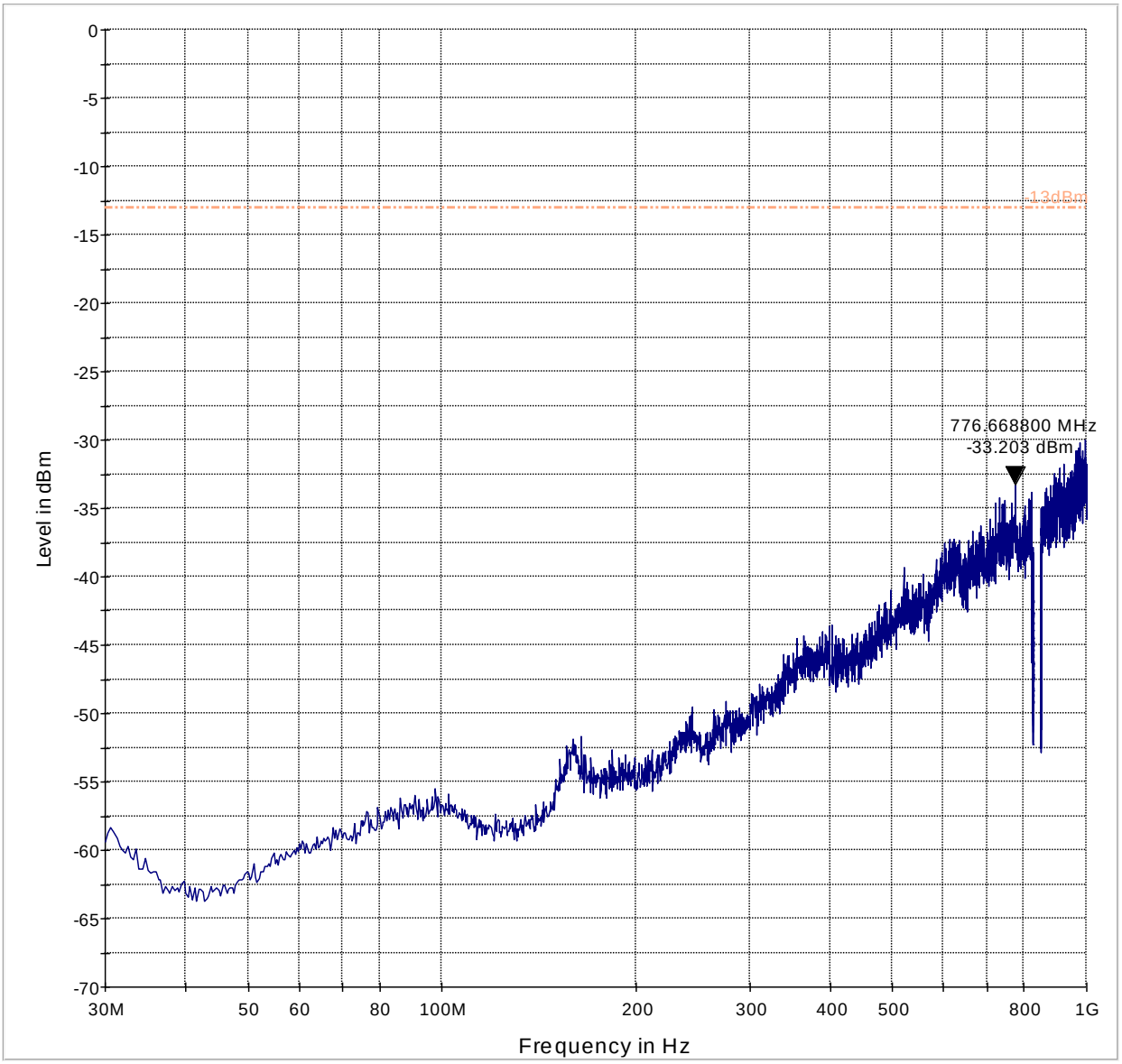


6.12 Radiated Emission Plots UMTS Band V

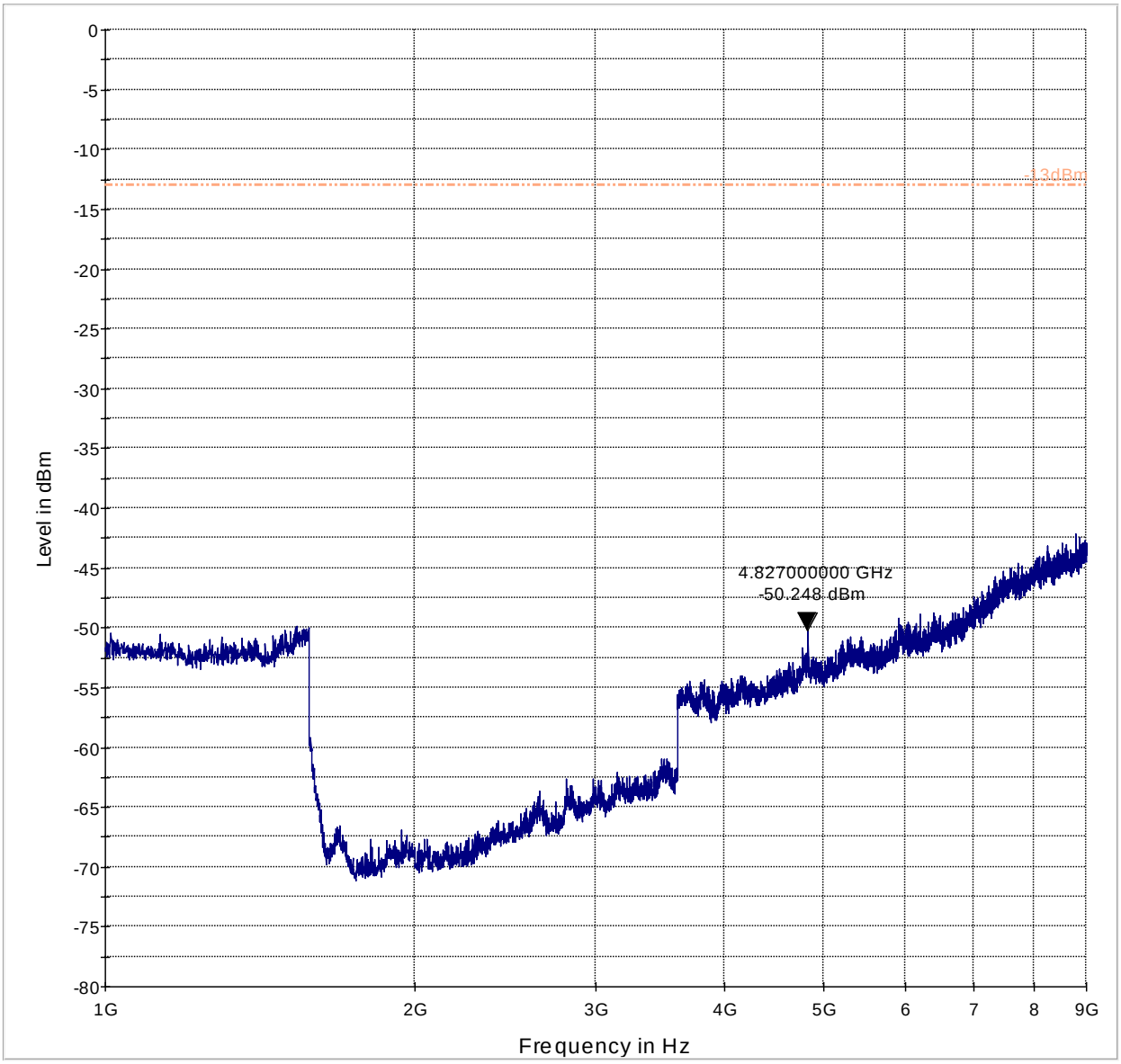
6.12.1 UMTS Band V Tx Low Channel 30MHz-1GHz internal antenna trace



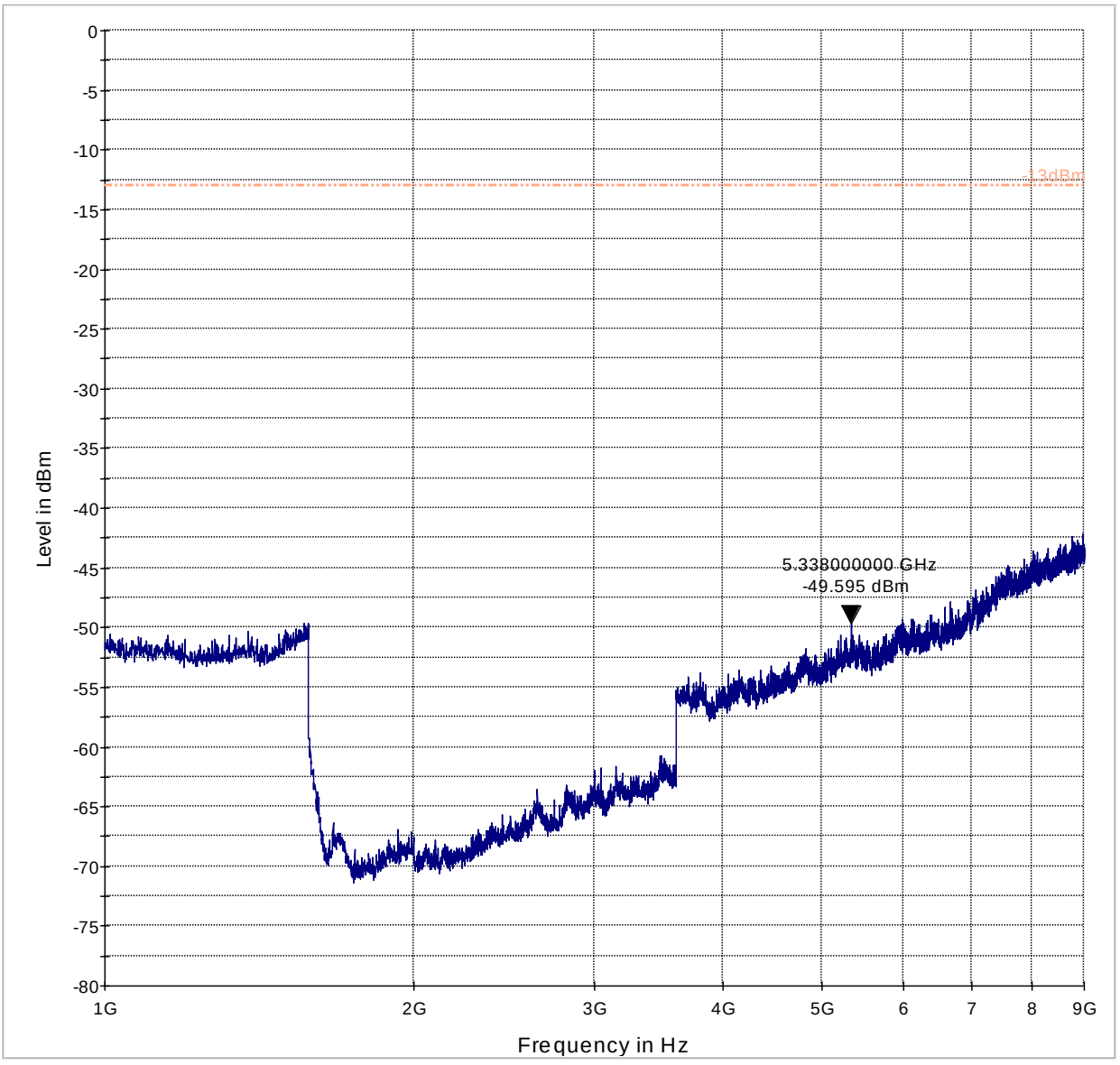
6.12.2 **UMTS Band V Tx Low Channel 30MHz-1GHz external antenna trace**



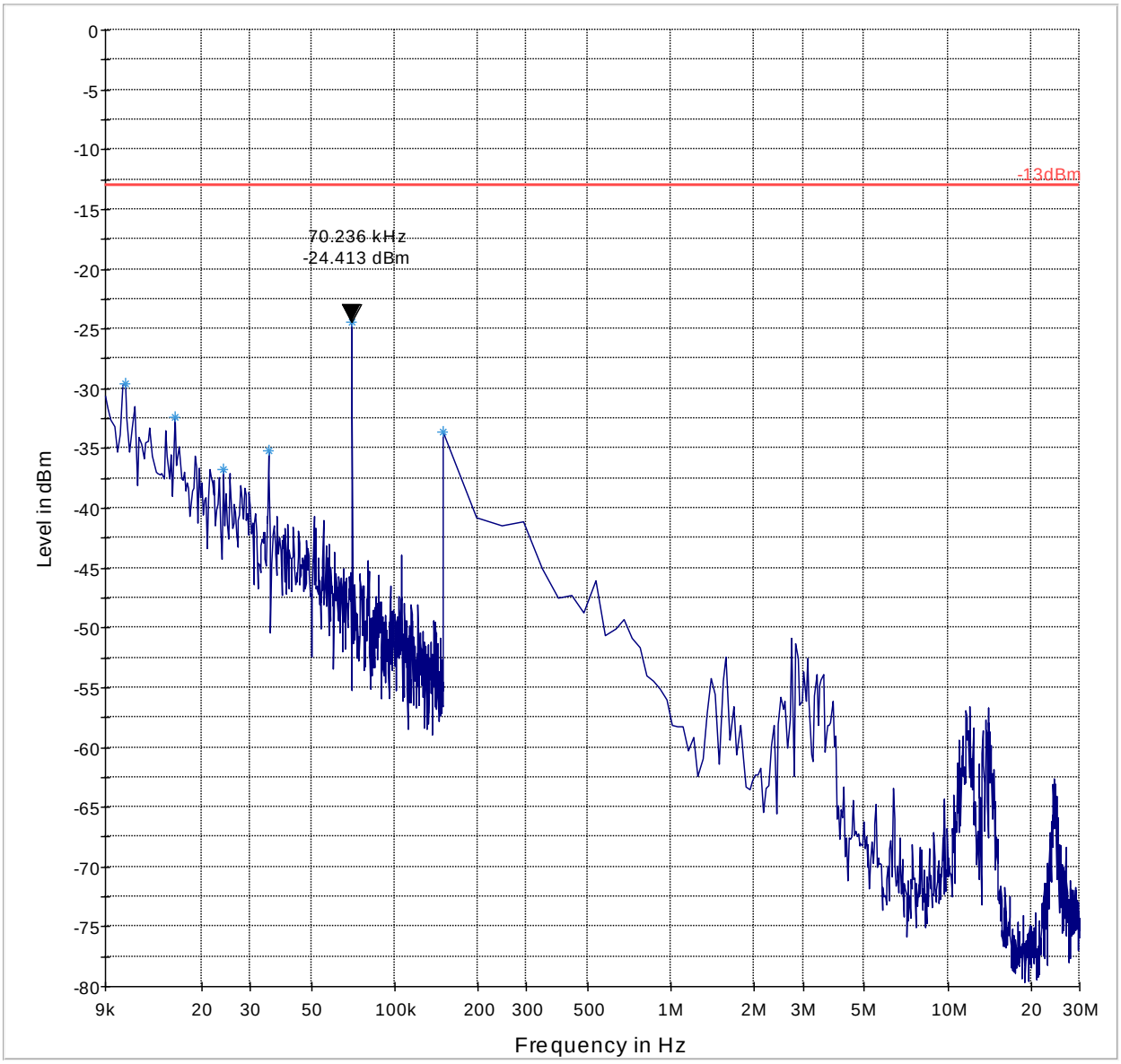
6.12.3 **UMTS Band V Tx Low Channel 1GHz-9GHz internal antenna trace**



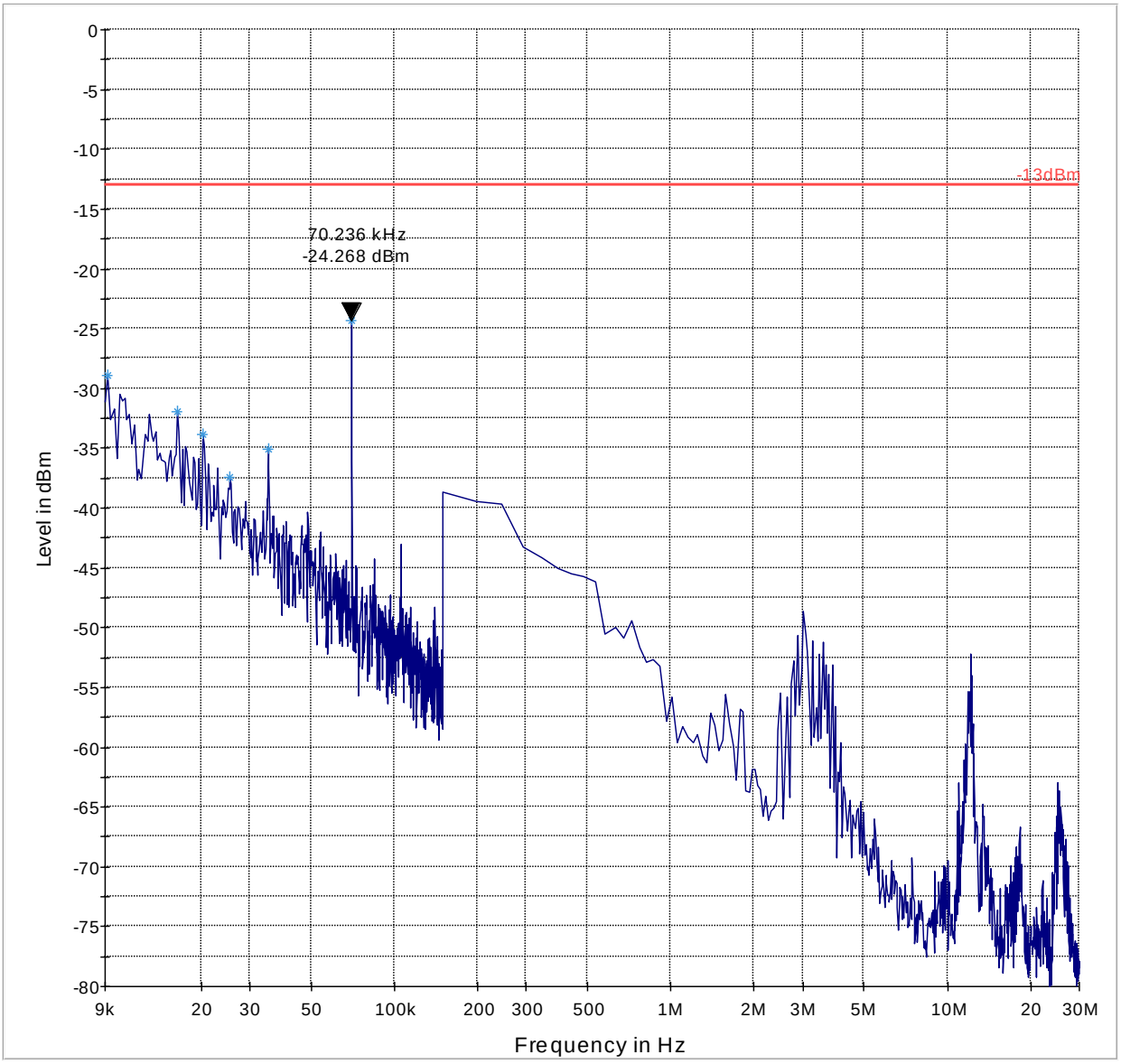
6.12.4 **UMTS Band V Tx Low Channel 1GHz-9GHz external antenna trace**



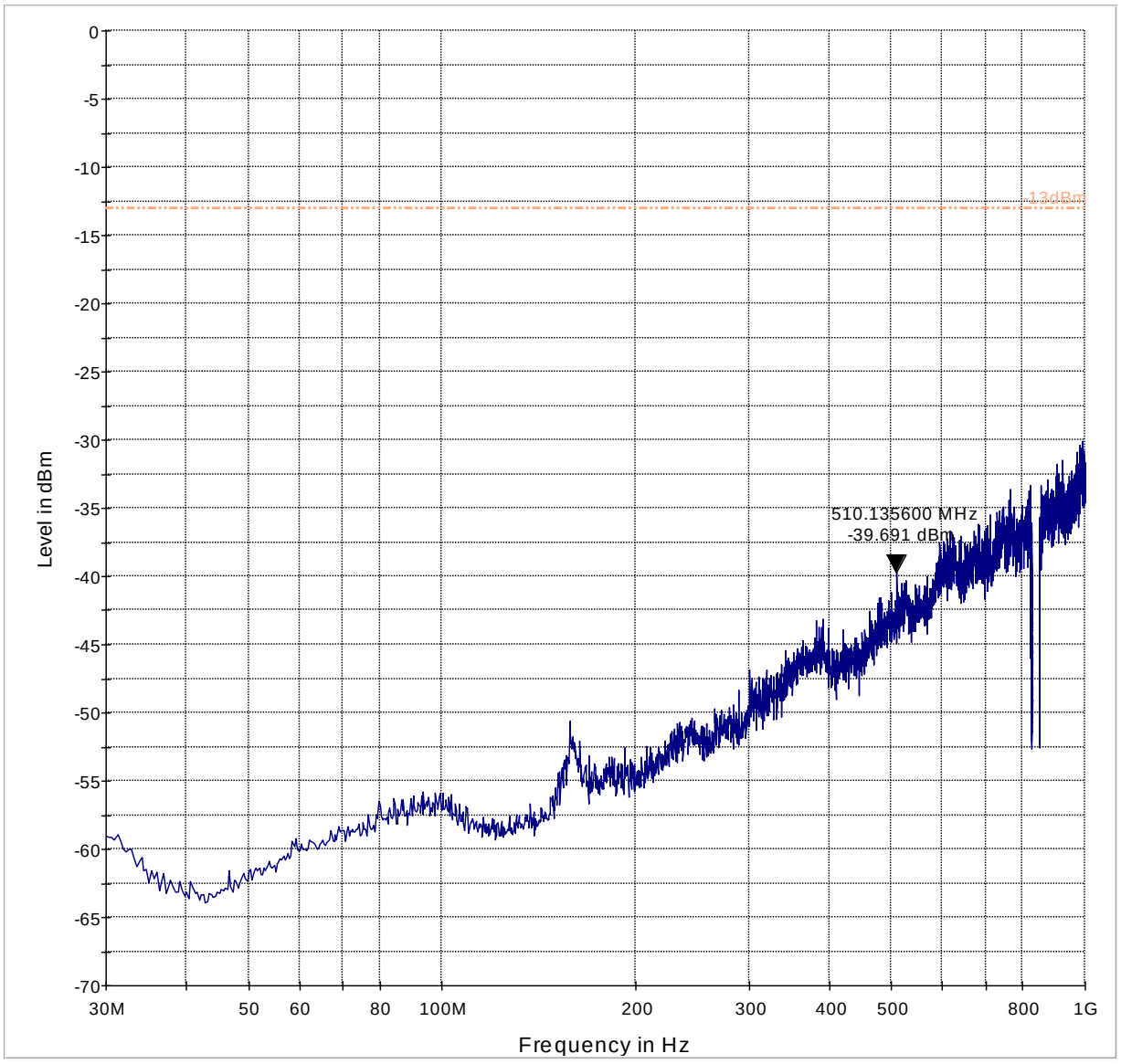
6.12.5 **UMTS Band V Tx Mid Channel 9kHz-30MHz internal antenna trace**



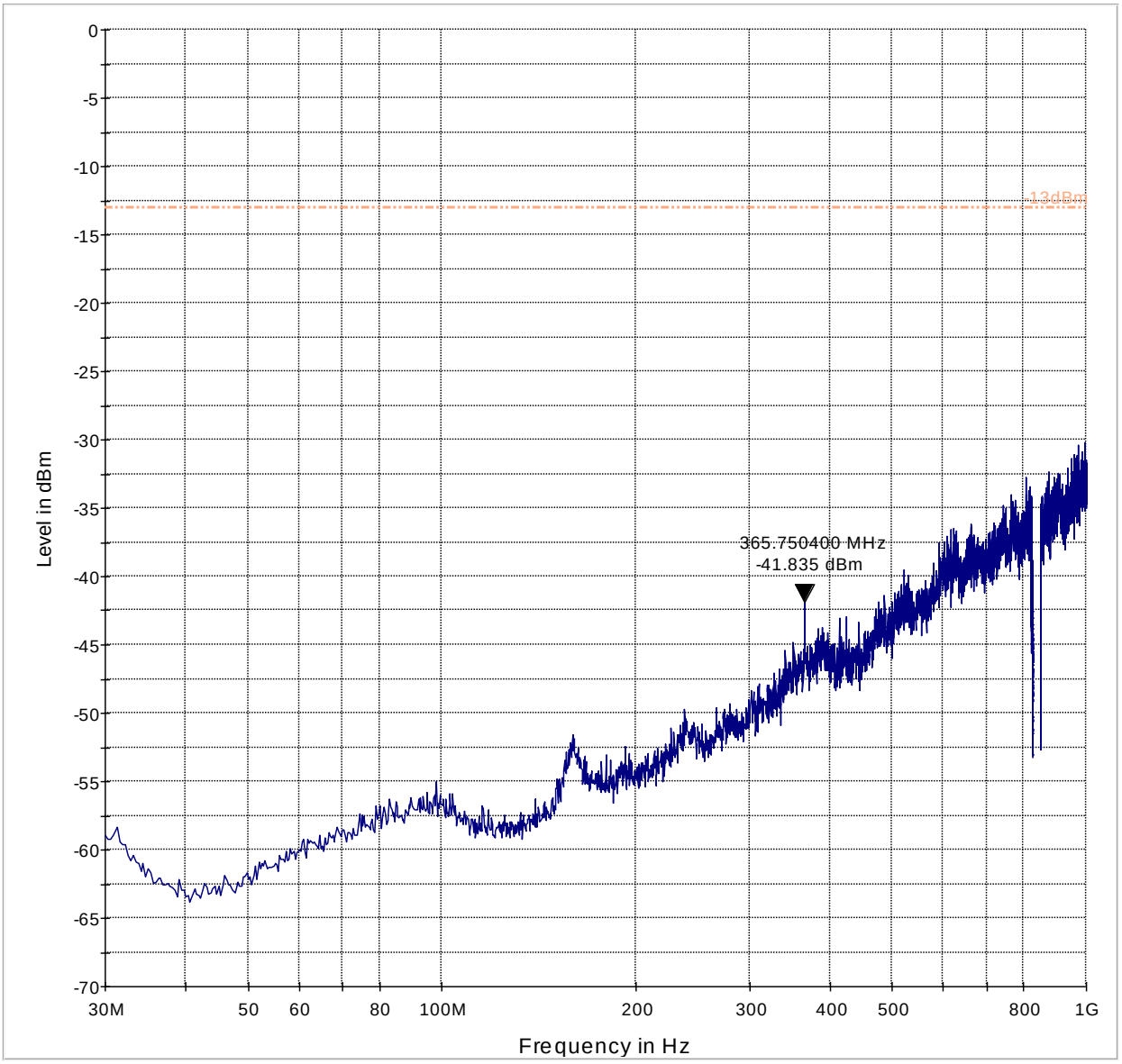
6.12.6 **UMTS Band V Tx Mid Channel 9kHz-30MHz external antenna trace**



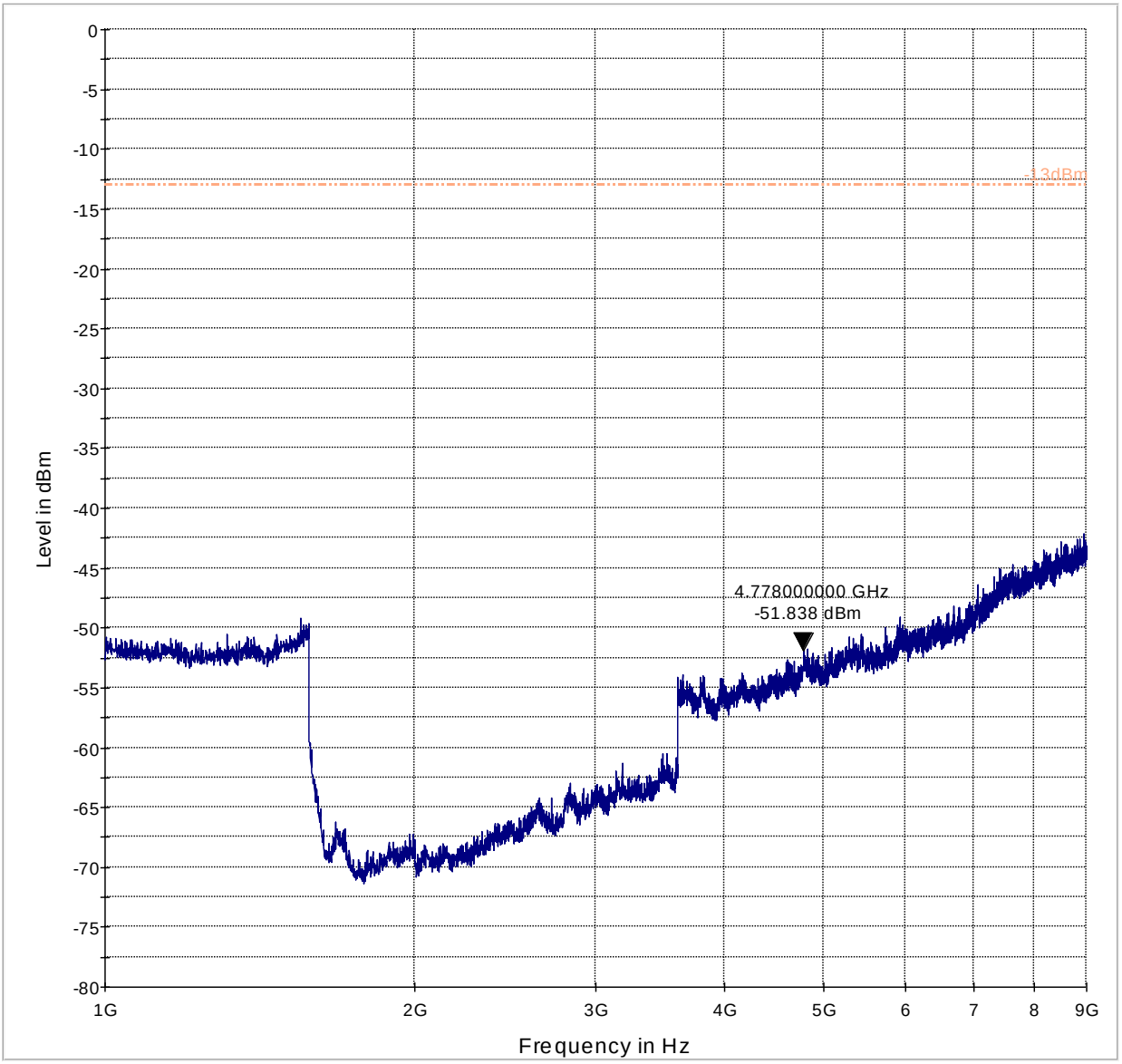
6.12.7 **UMTS Band V Tx Mid Channel 30MHz-1GHz internal antenna trace**



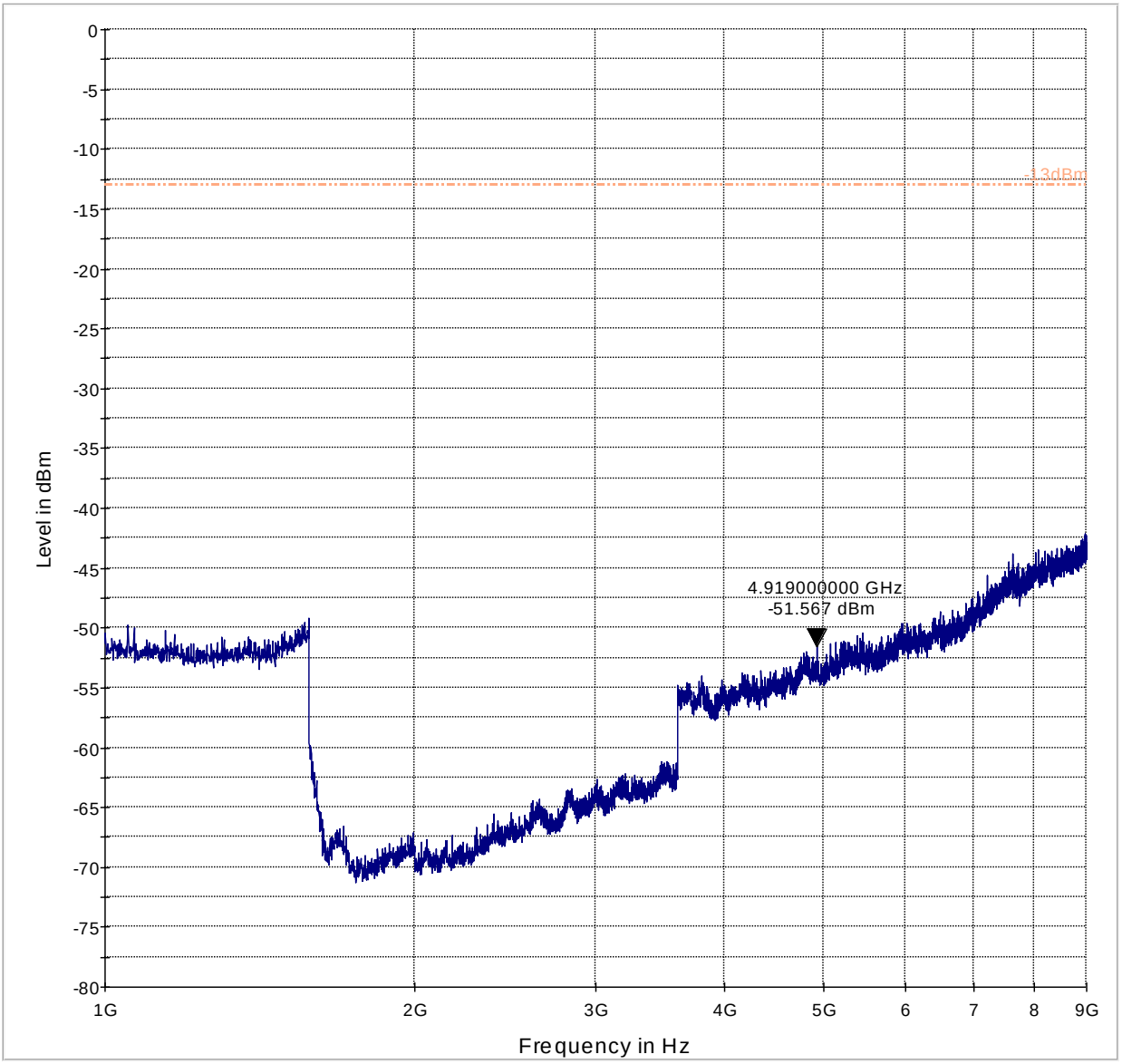
6.12.8 **UMTS Band V Tx Mid Channel 30MHz-1GHz external antenna trace**



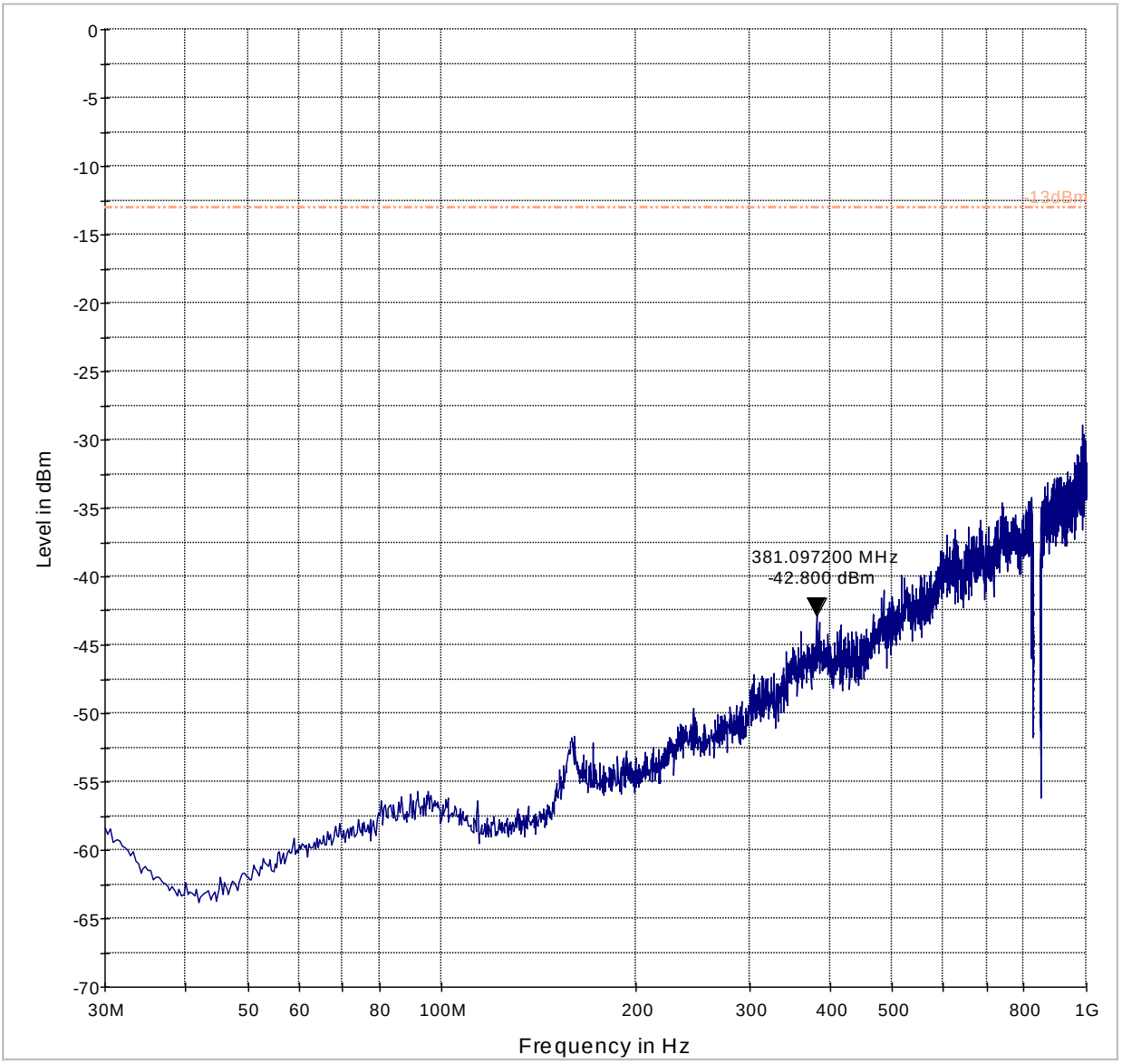
6.12.9 **UMTS Band V Tx Mid Channel 1GHz-9GHz internal antenna trace**



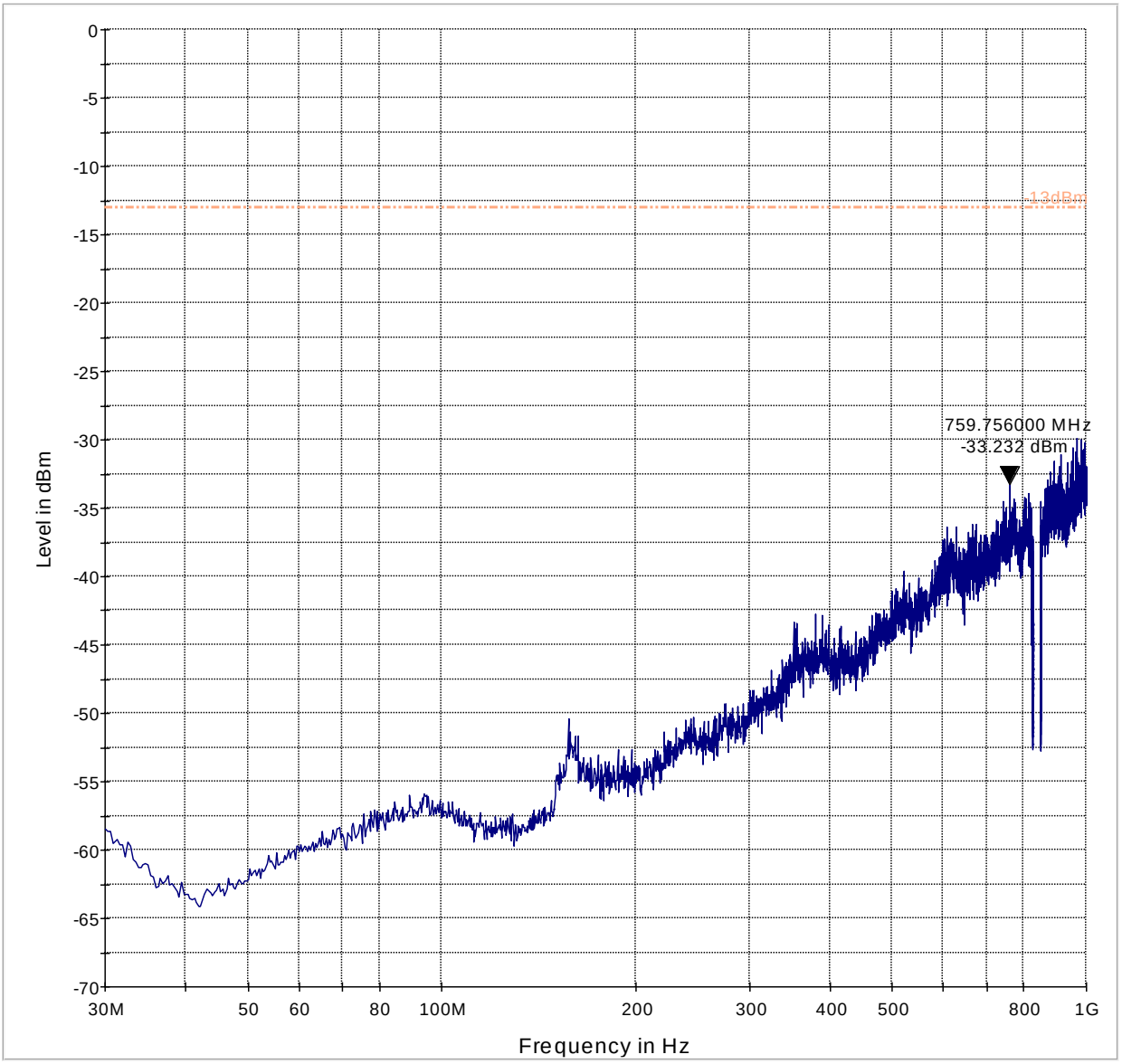
6.12.10 **UMTS Band V Tx Mid Channel 1GHz-9GHz external antenna trace**



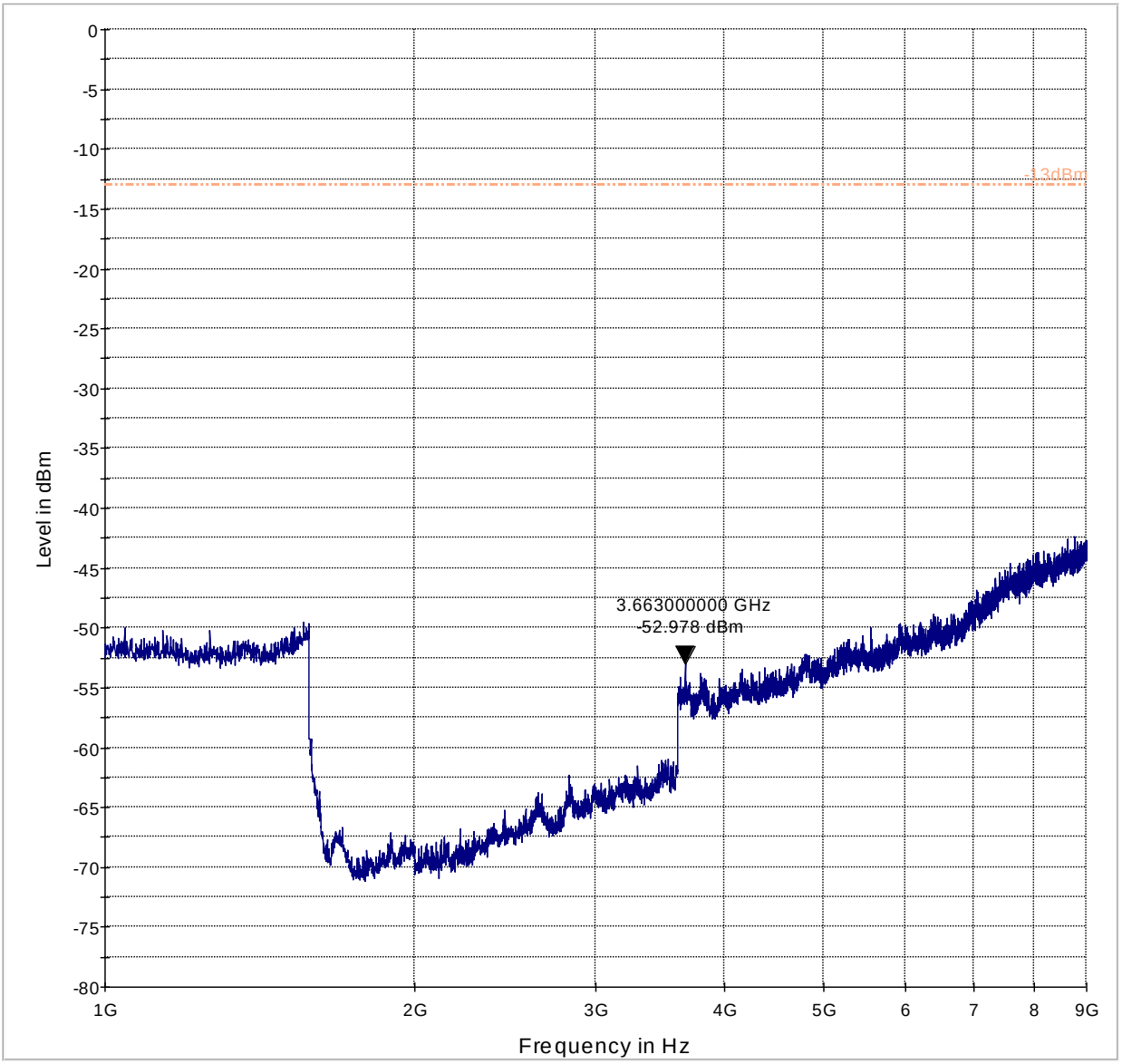
6.12.11 UMTS Band V Tx High Channel 30MHz-1GHz internal antenna trace



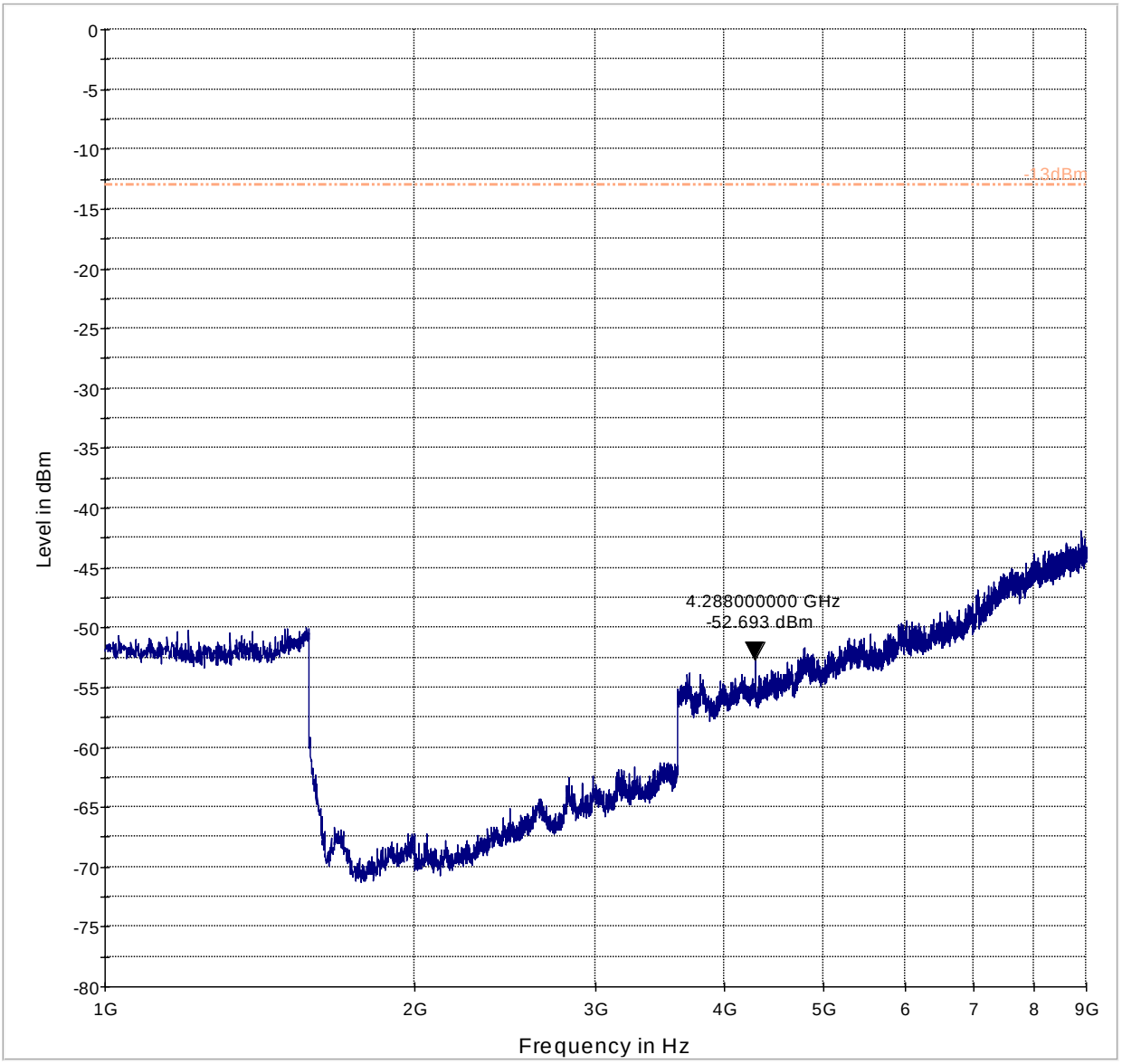
6.12.12 **UMTS Band V Tx High Channel 30MHz-1GHz external antenna trace**



6.12.13 **UMTS Band V Tx High Channel 1GHz-9GHz internal antenna trace**

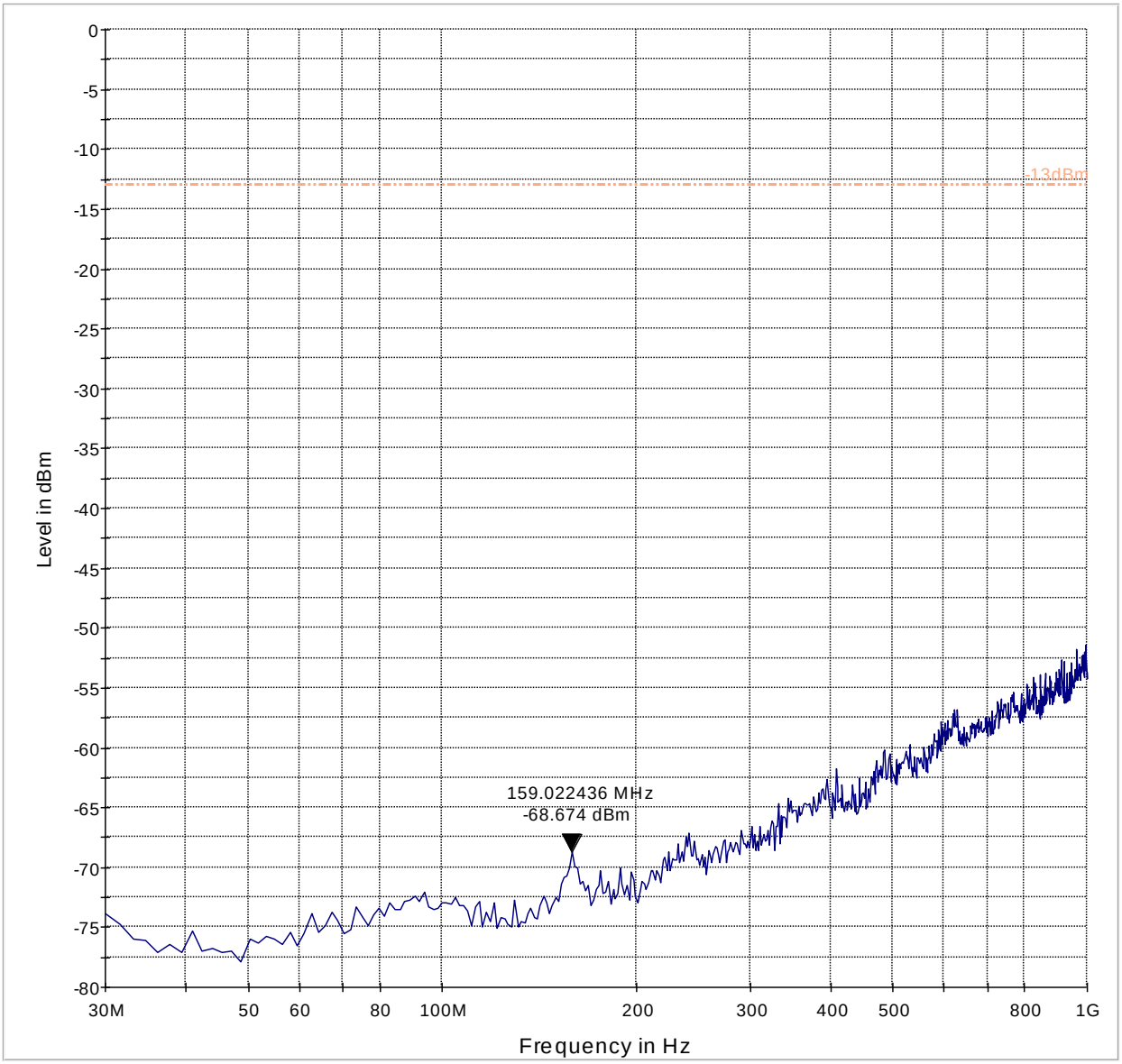


6.12.14 **UMTS Band V Tx High Channel 1GHz-9GHz external antenna trace**

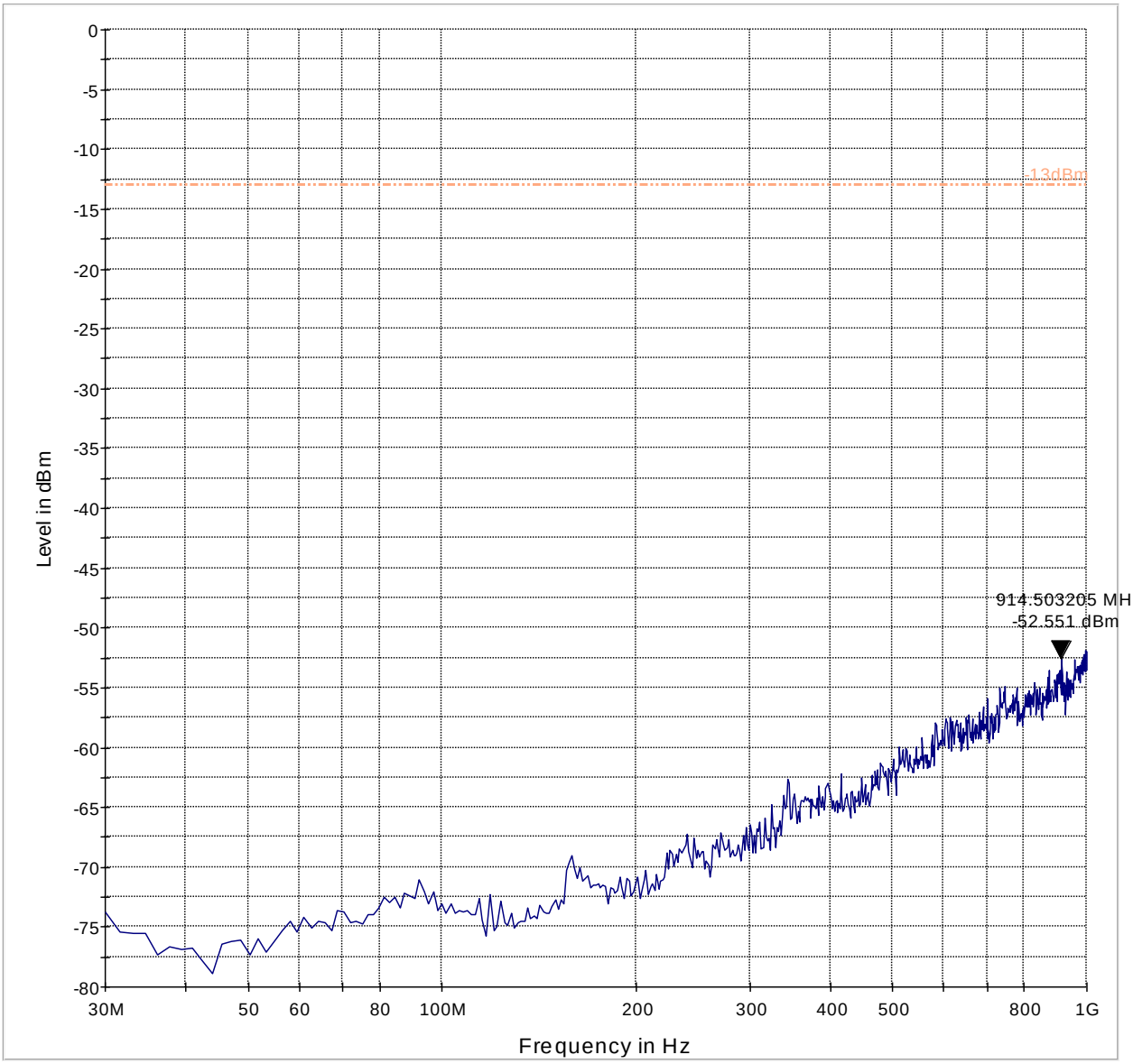


6.13 Radiated Emission Plots UMTS Band II

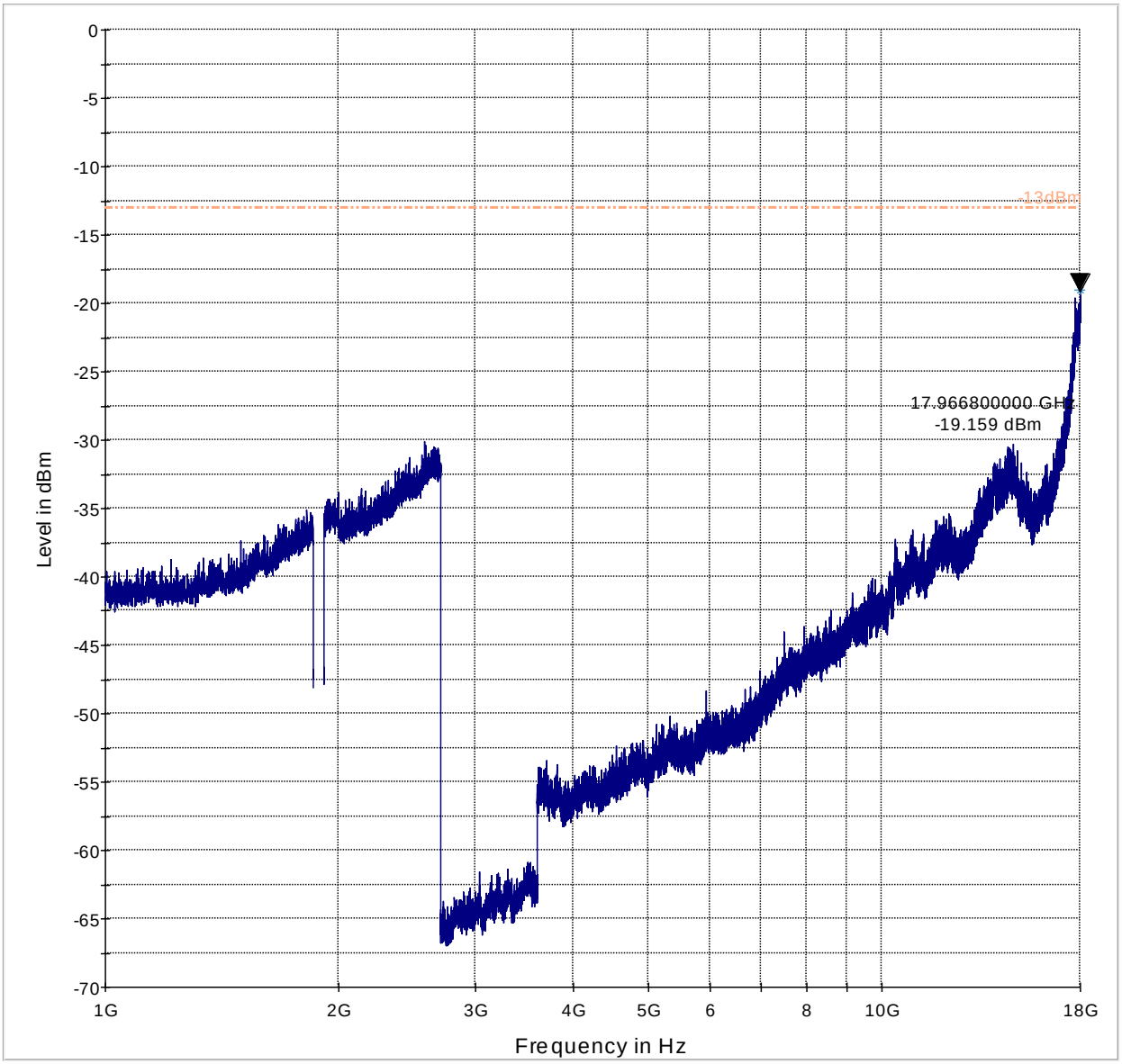
6.13.1 UMTS Band II Tx Low Channel 30MHz-1GHz internal antenna trace



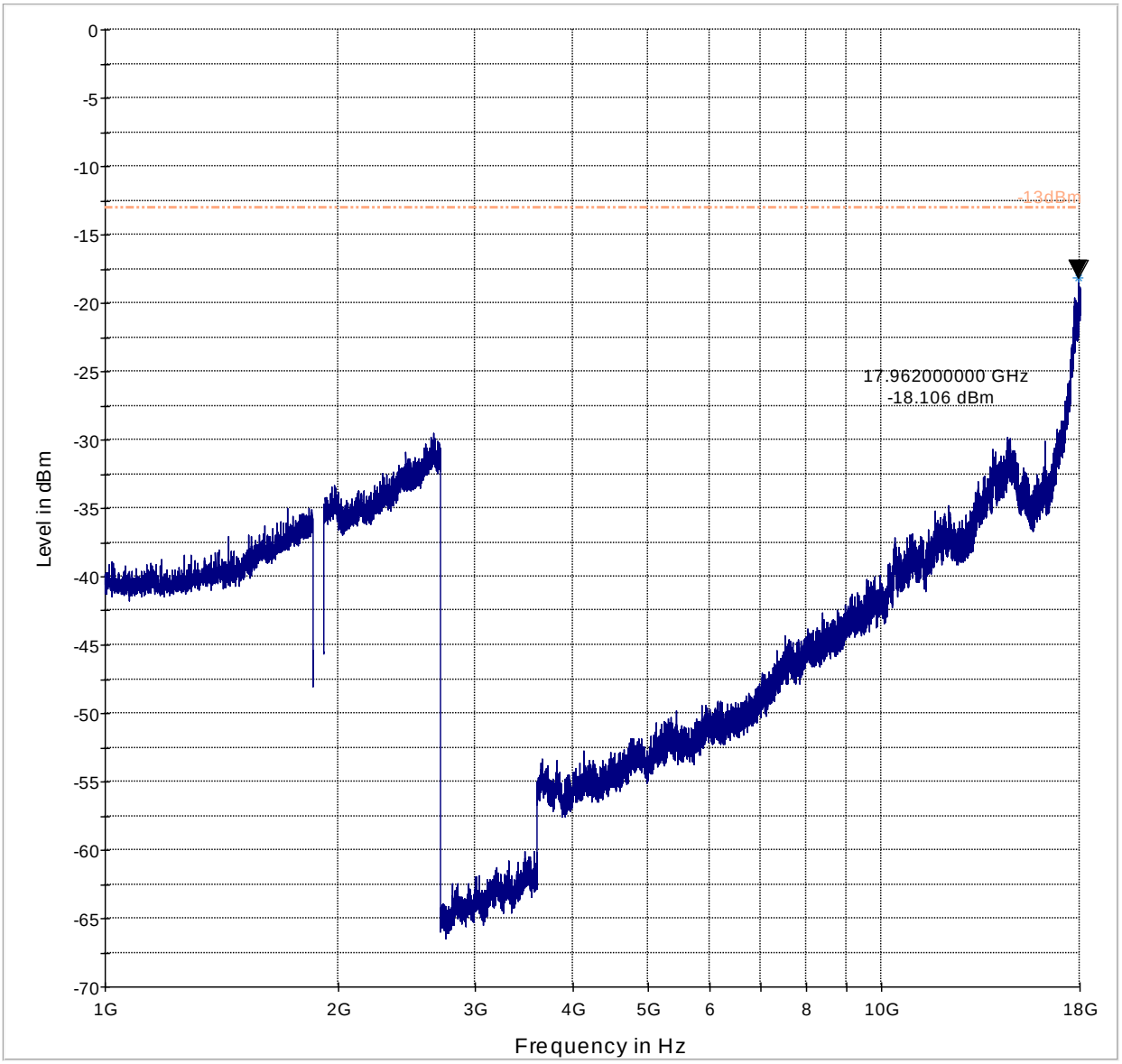
6.13.2 **UMTS Band II Tx Low Channel 30MHz-1GHz external antenna trace**



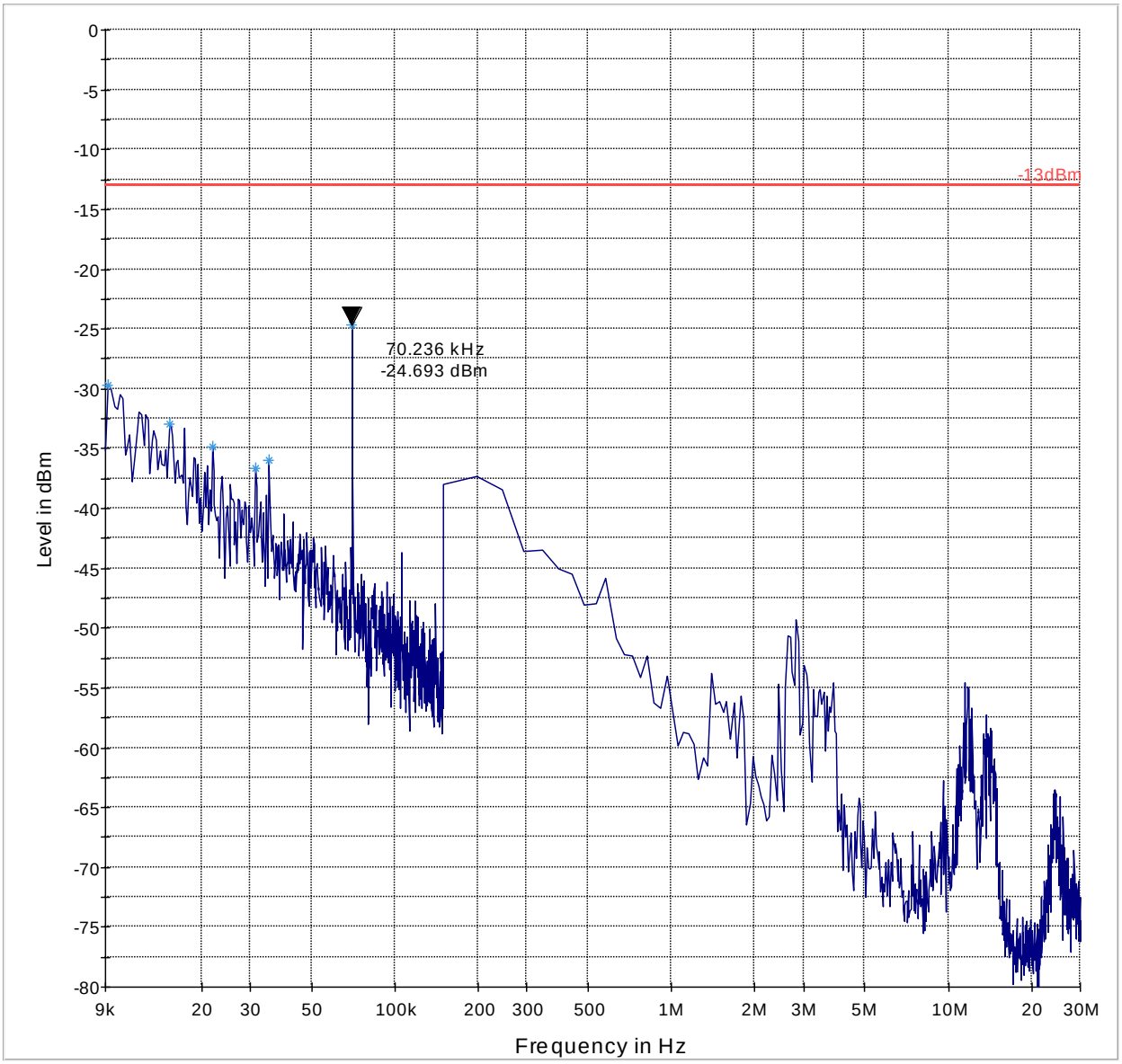
6.13.3 **UMTS Band II Tx Low Channel 1GHz-18GHz internal antenna trace**



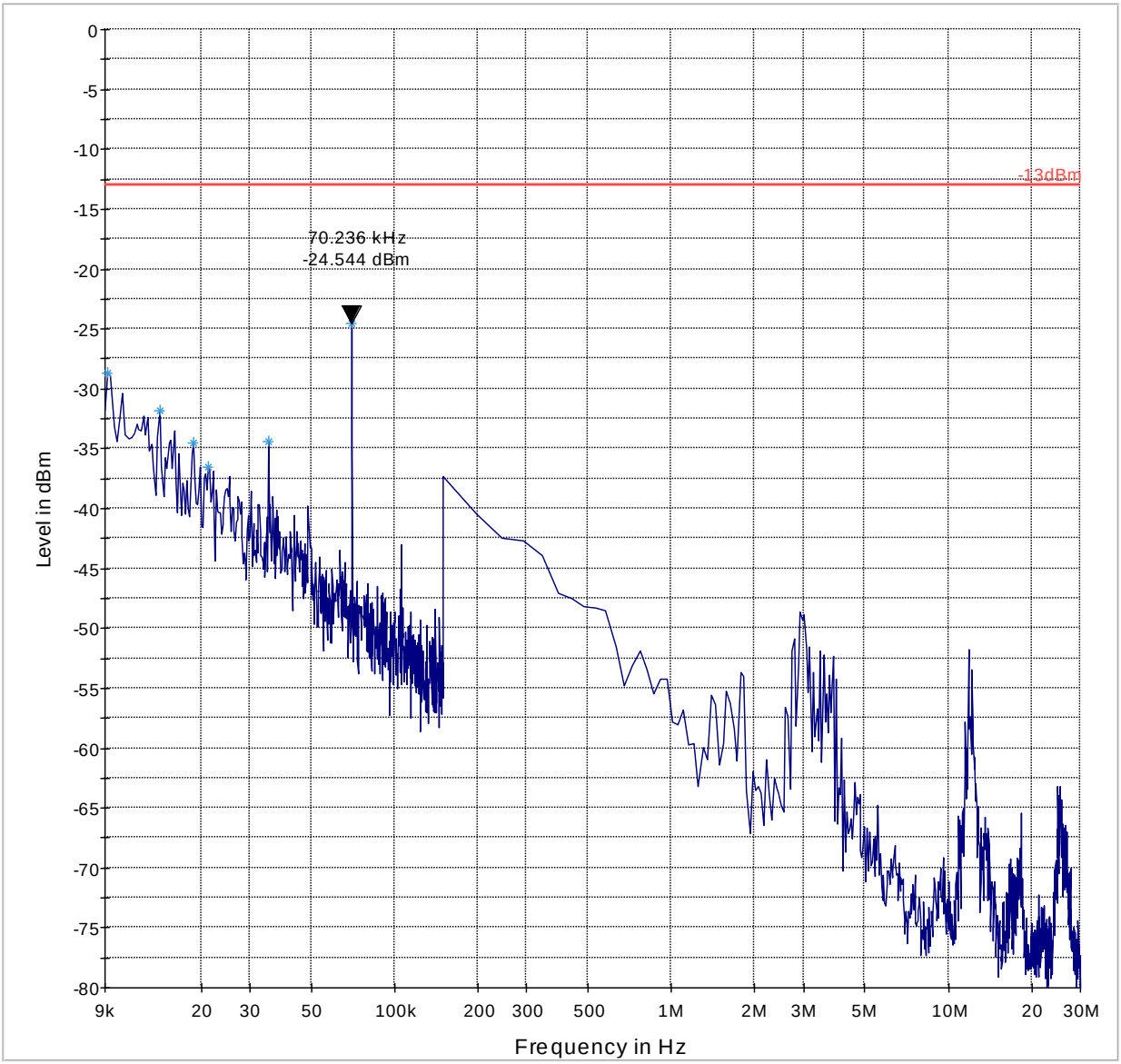
6.13.4 **UMTS Band II Tx Low Channel 1GHz-18GHz external antenna trace**



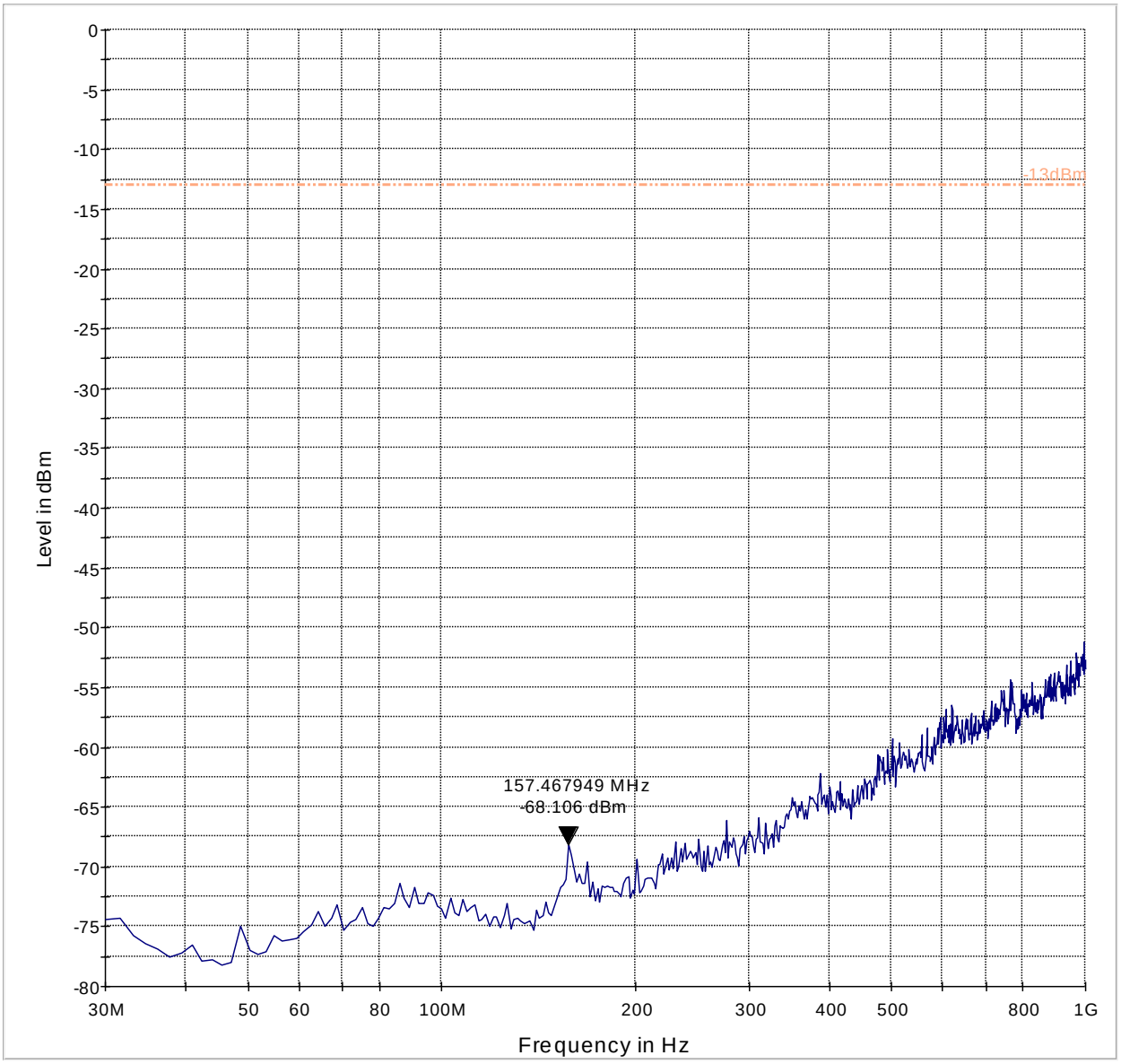
6.13.5 **UMTS Band II Tx Mid Channel 9kHz-30MHz internal antenna trace**



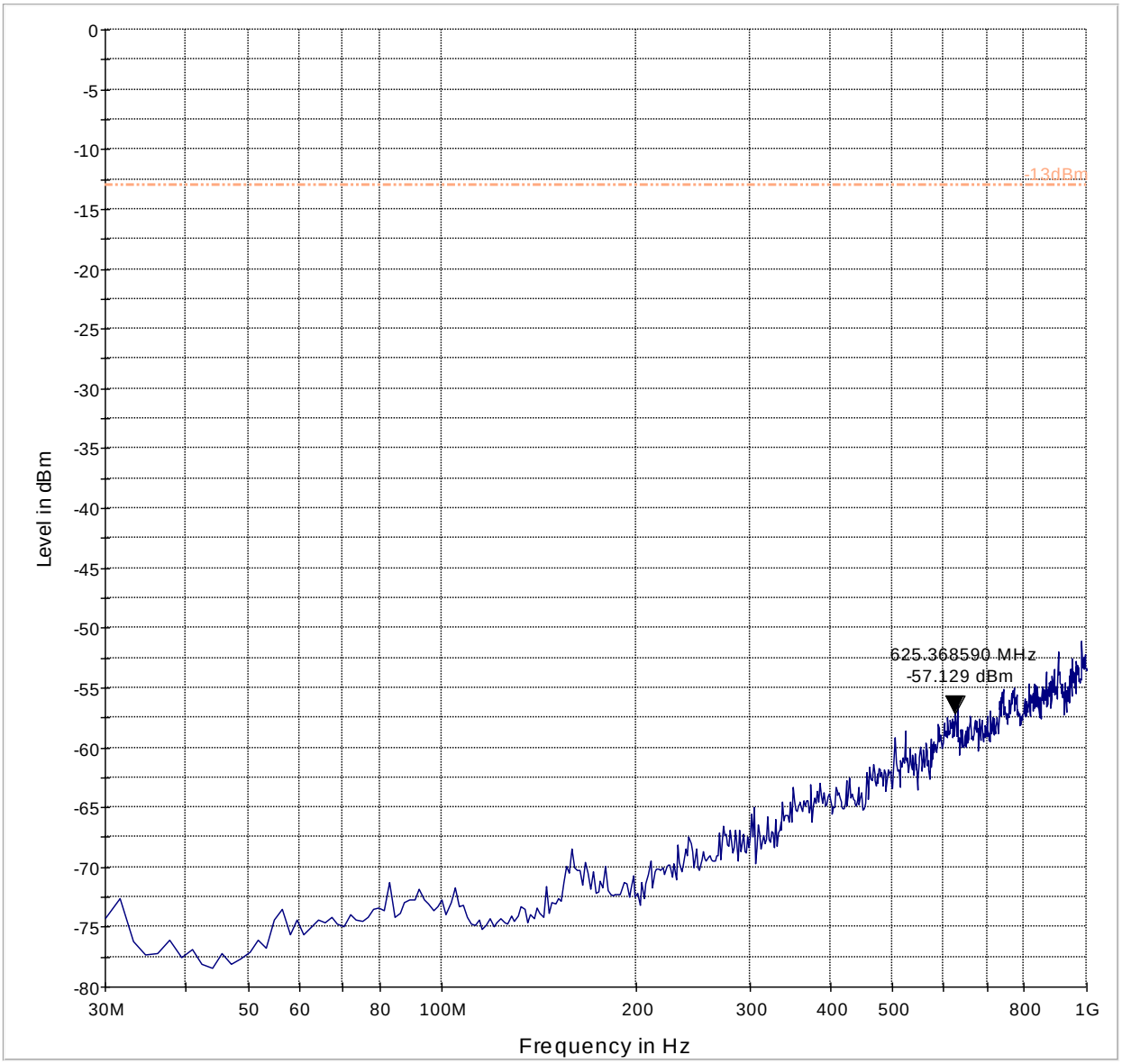
6.13.6 **UMTS Band II Tx Mid Channel 9kHz-30MHz external antenna trace**



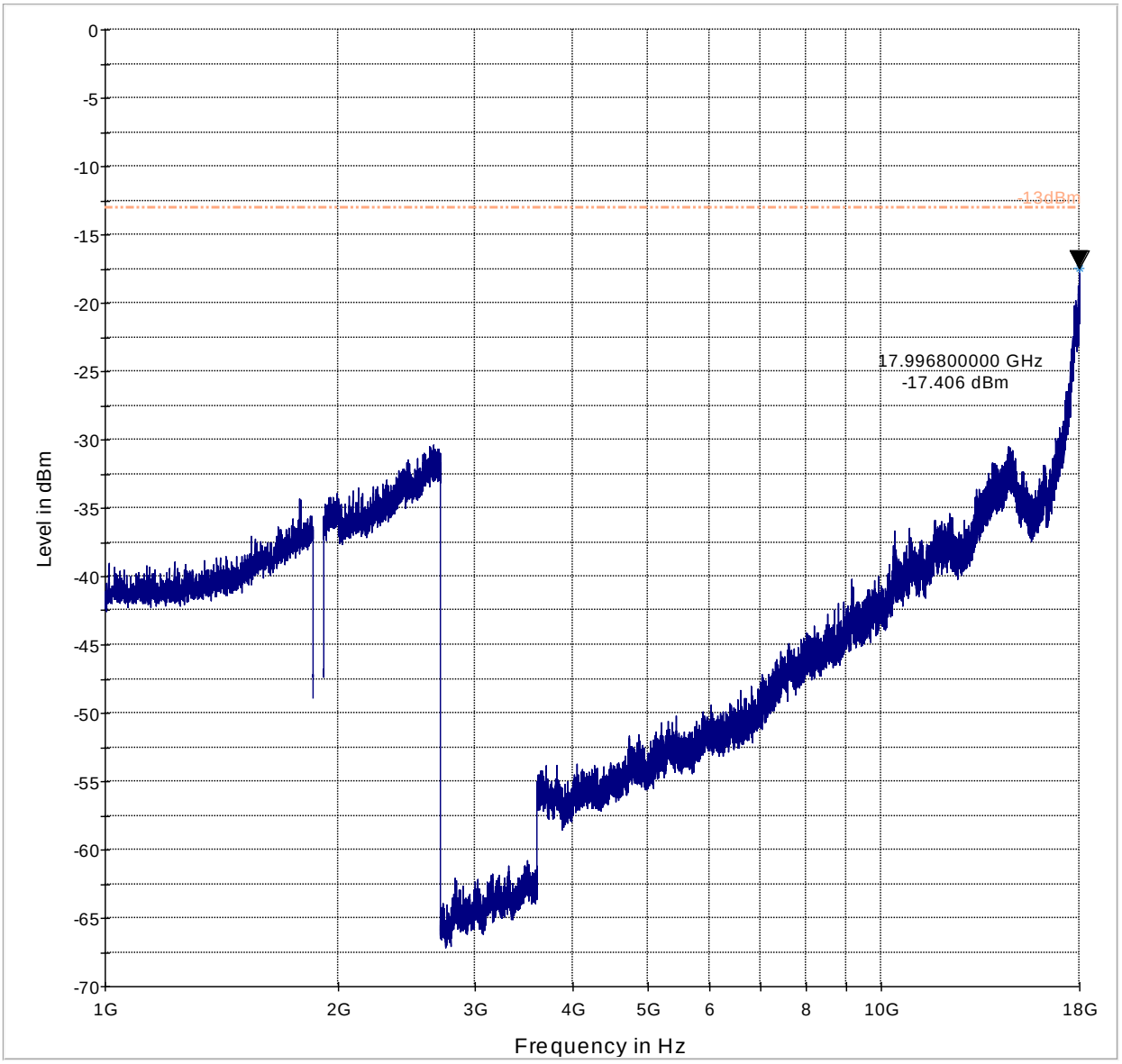
6.13.7 **UMTS Band II Tx Mid Channel 30MHz-1GHz internal antenna trace**



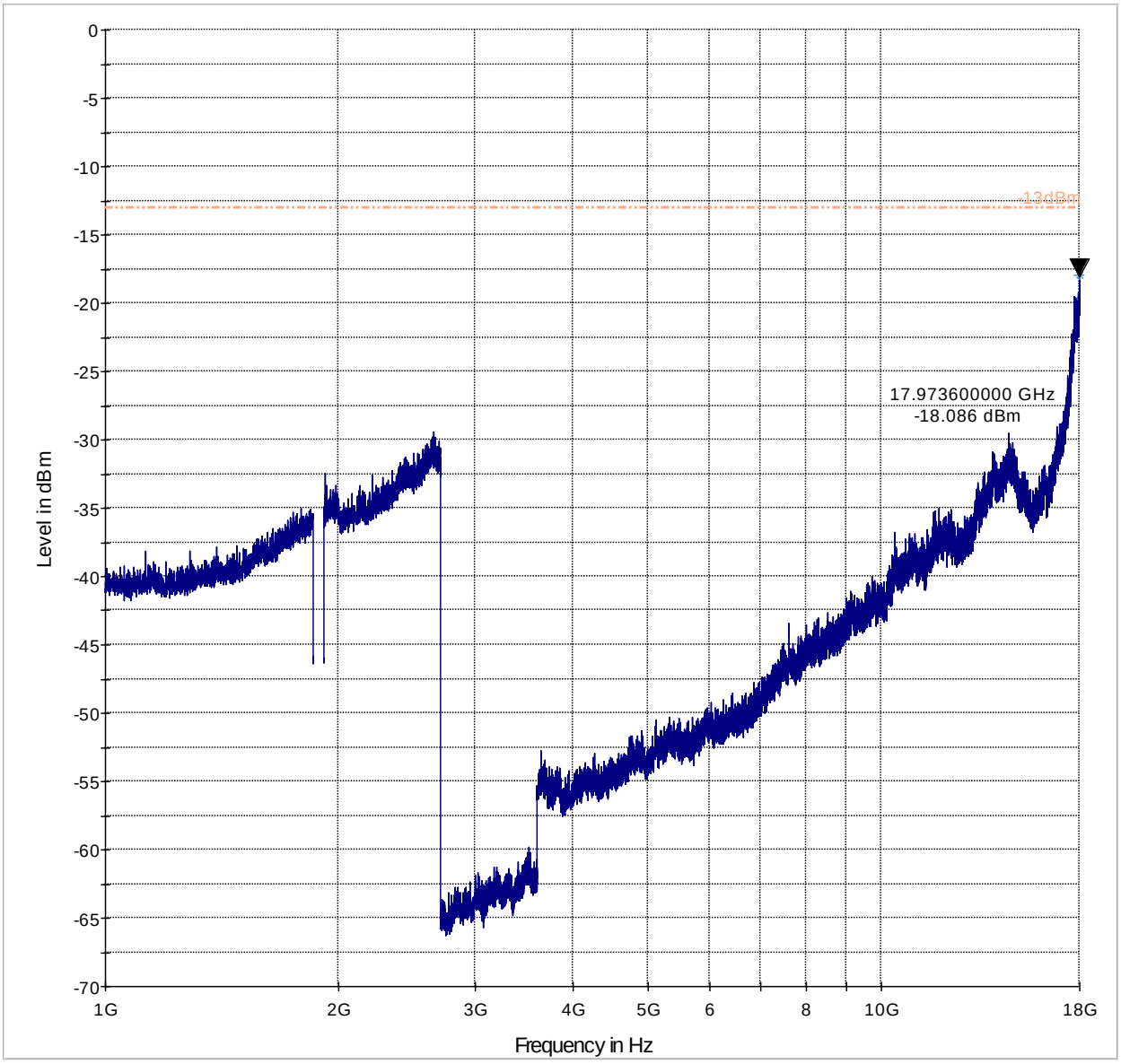
6.13.8 **UMTS Band II Tx Mid Channel 30MHz-1GHz external antenna trace**



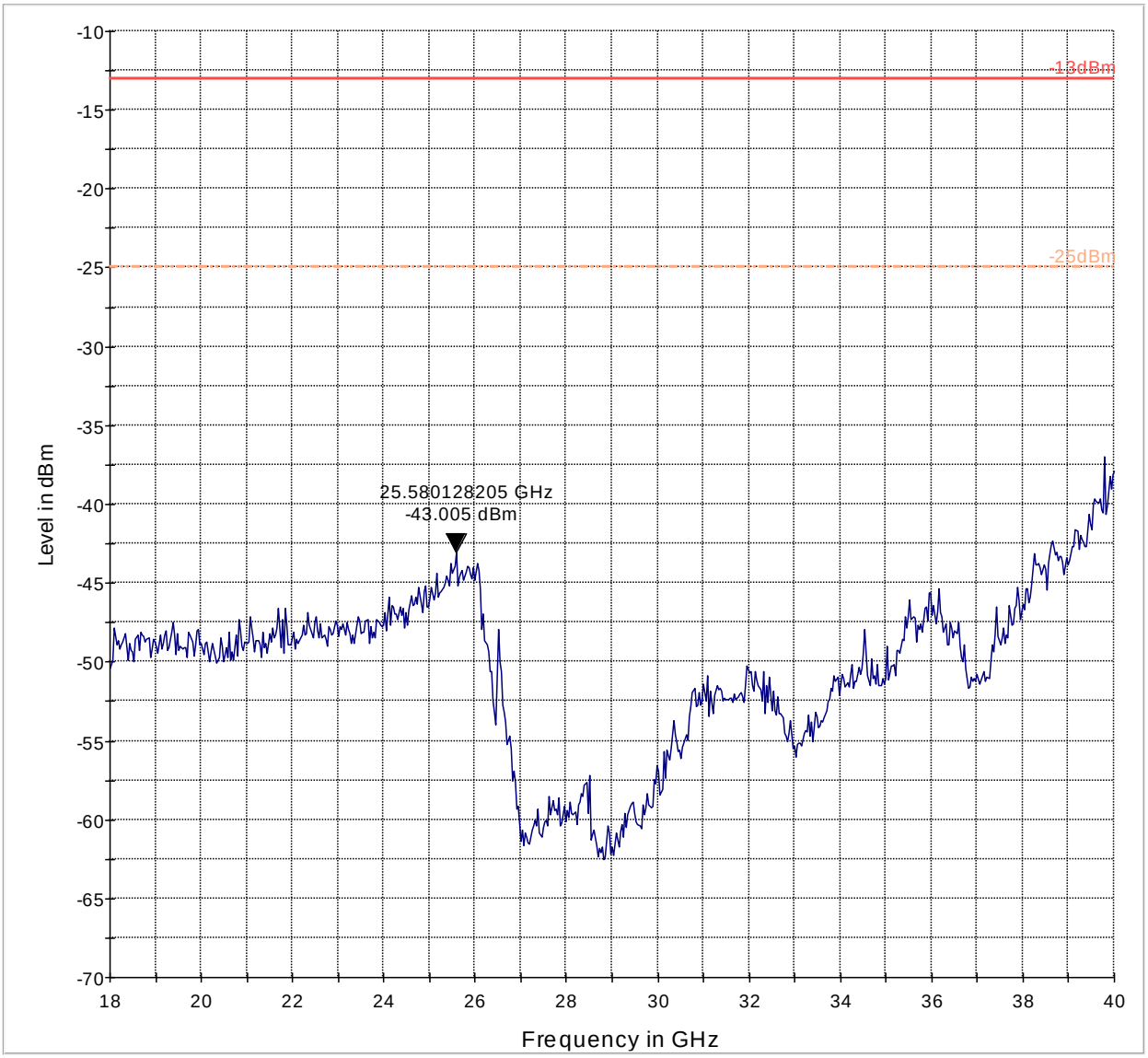
6.13.9 **UMTS Band II Tx Mid Channel 1GHz-18GHz internal antenna trace**



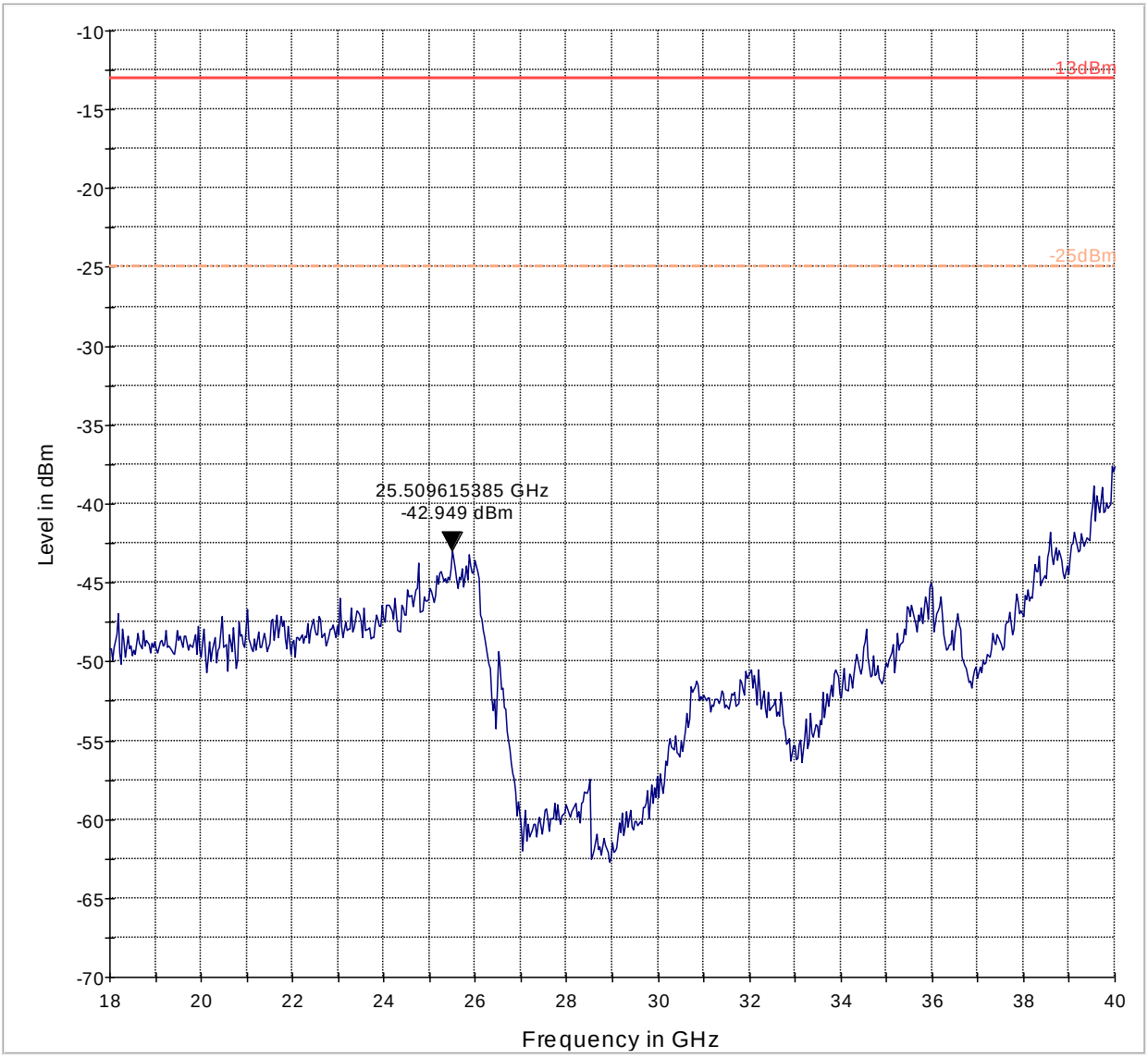
6.13.10 **UMTS Band II Tx Mid Channel 1GHz-18GHz external antenna trace**



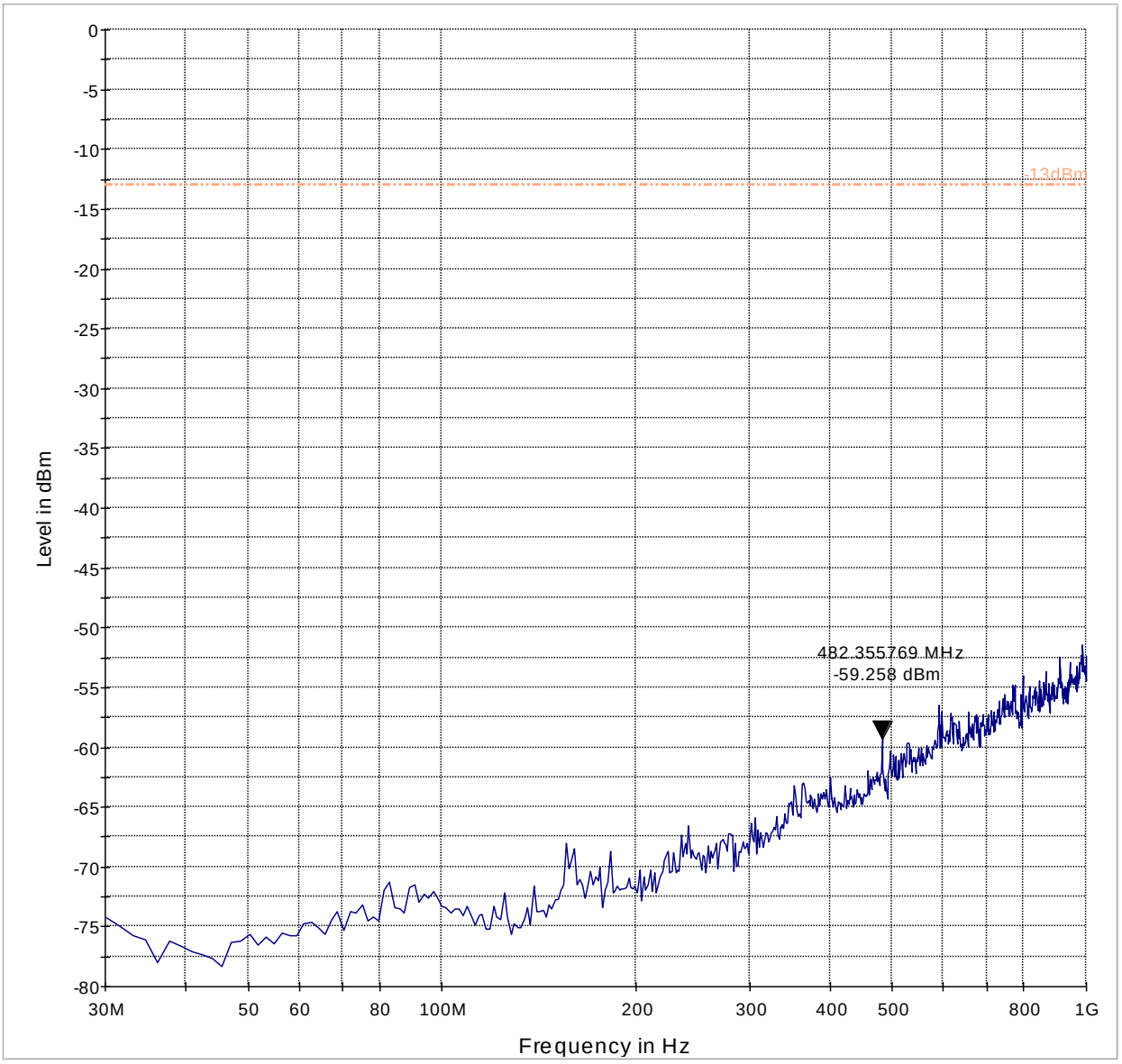
6.13.11 UMTS Band II Tx Mid Channel 18GHz-40GHz internal antenna trace



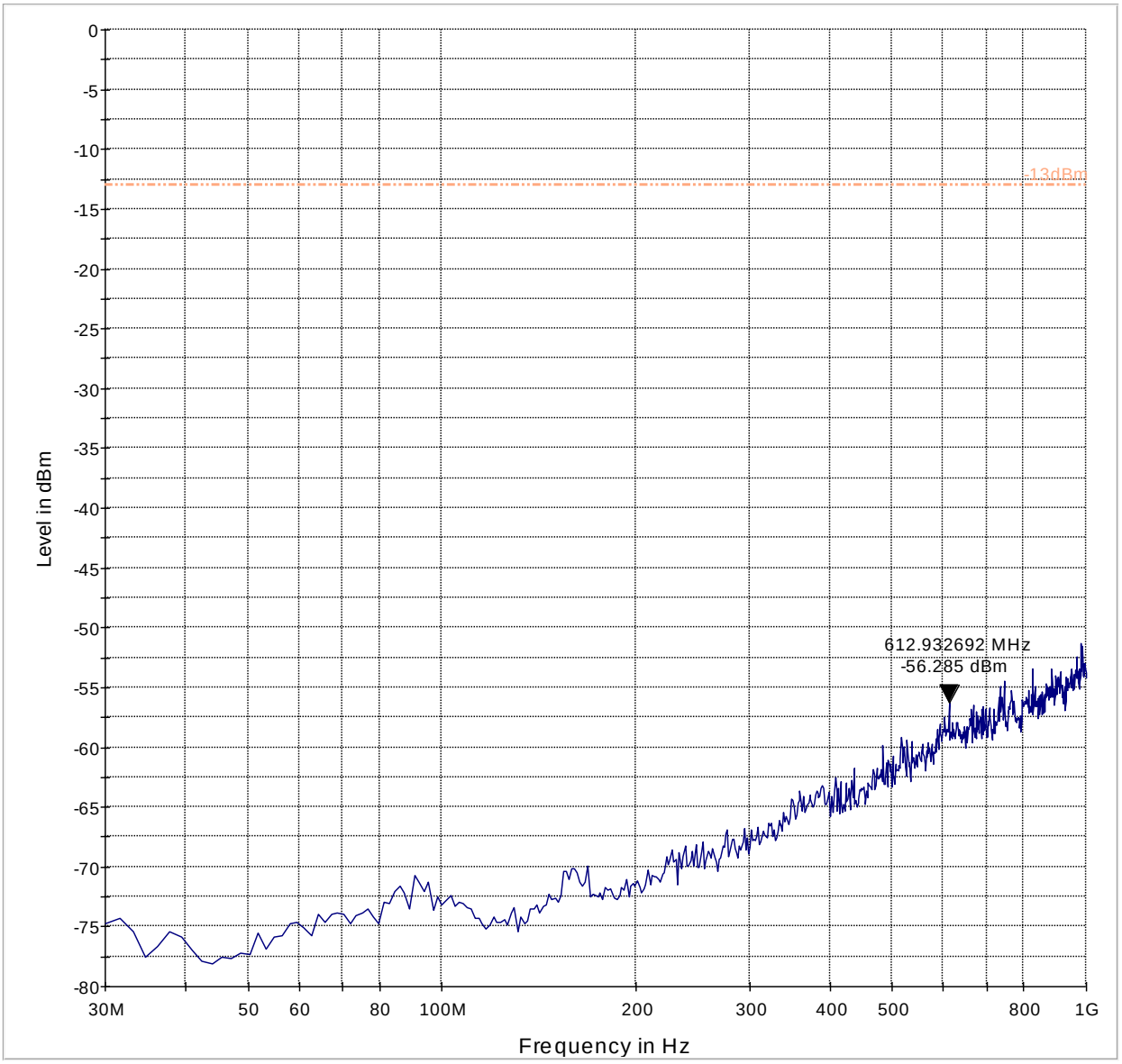
6.13.12 **UMTS Band II Tx Mid Channel 18GHz-40GHz external antenna trace**



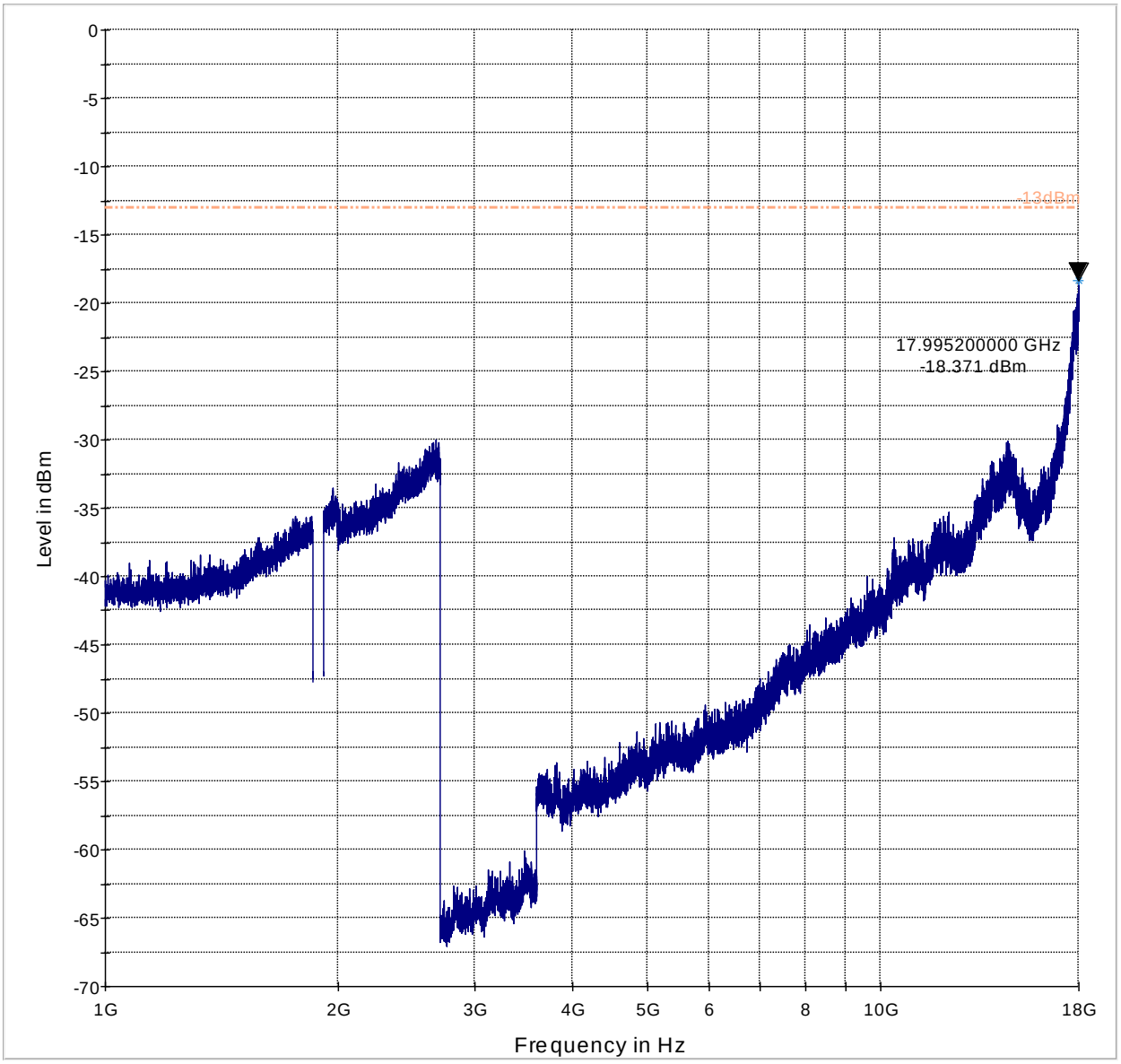
6.13.13 UMTS Band II Tx High Channel 30MHz-1GHz internal antenna trace



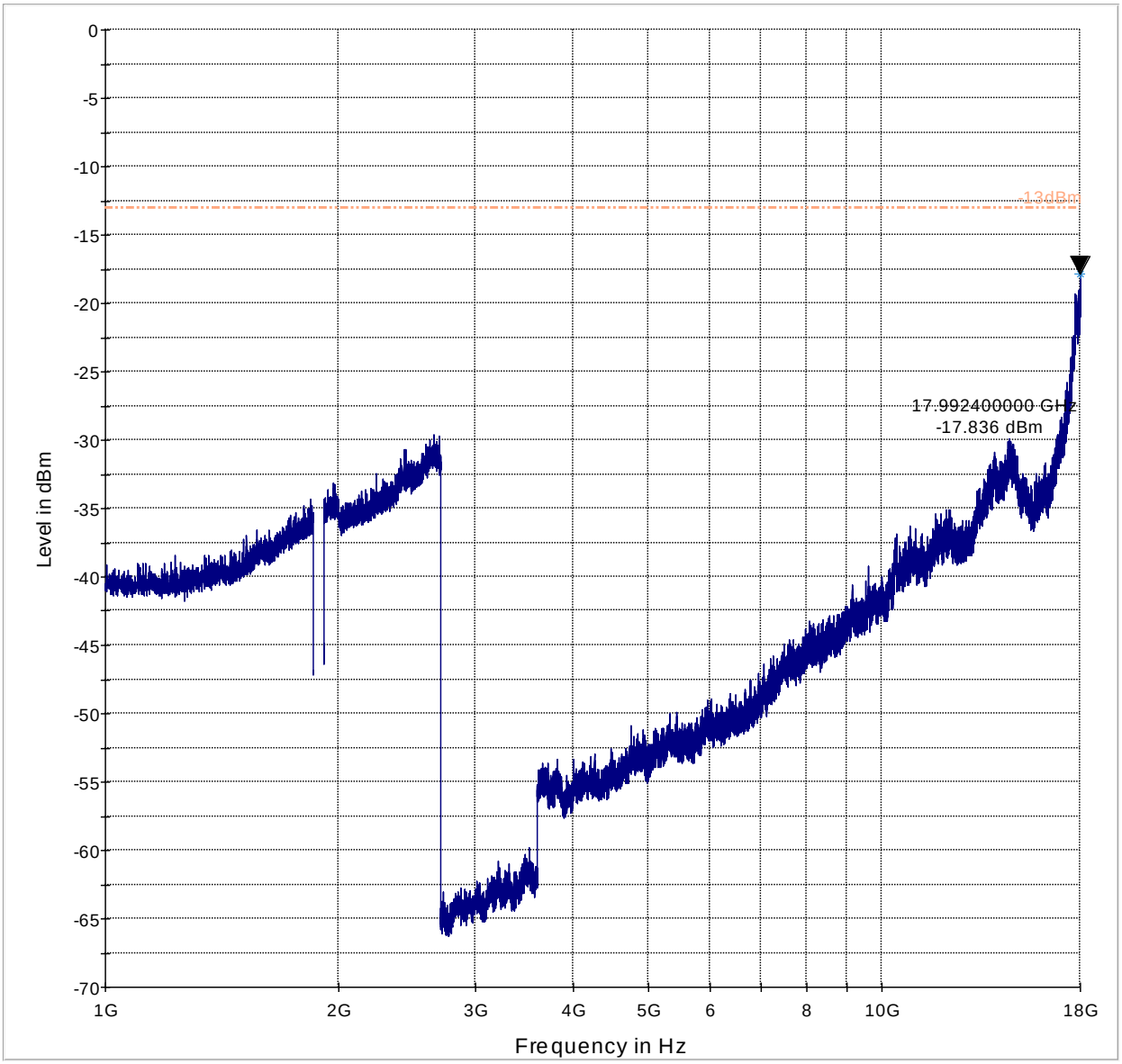
6.13.14 UMTS Band II Tx High Channel 30MHz-1GHz external antenna trace



6.13.15 **UMTS Band II Tx High Channel 1GHz-18GHz internal antenna trace**



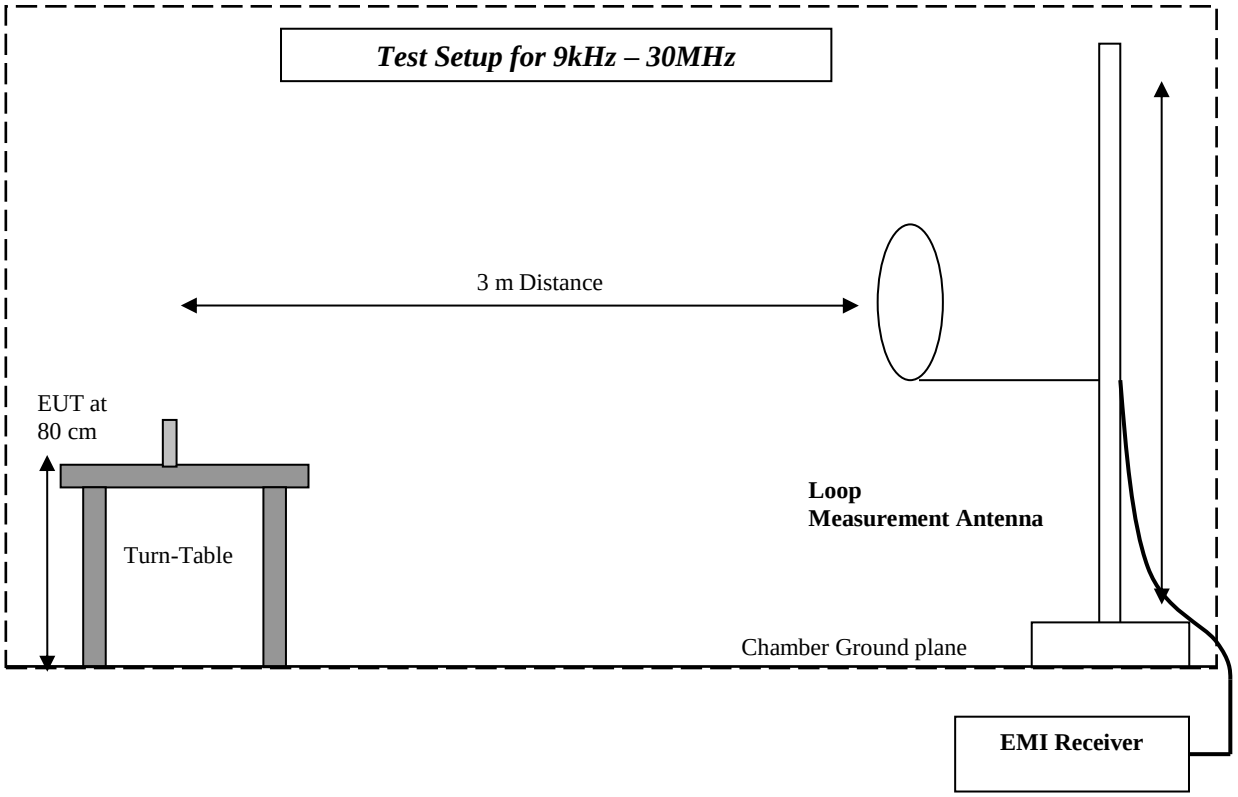
6.13.16 **UMTS Band II Tx High Channel 1GHz-18GHz external antenna trace**

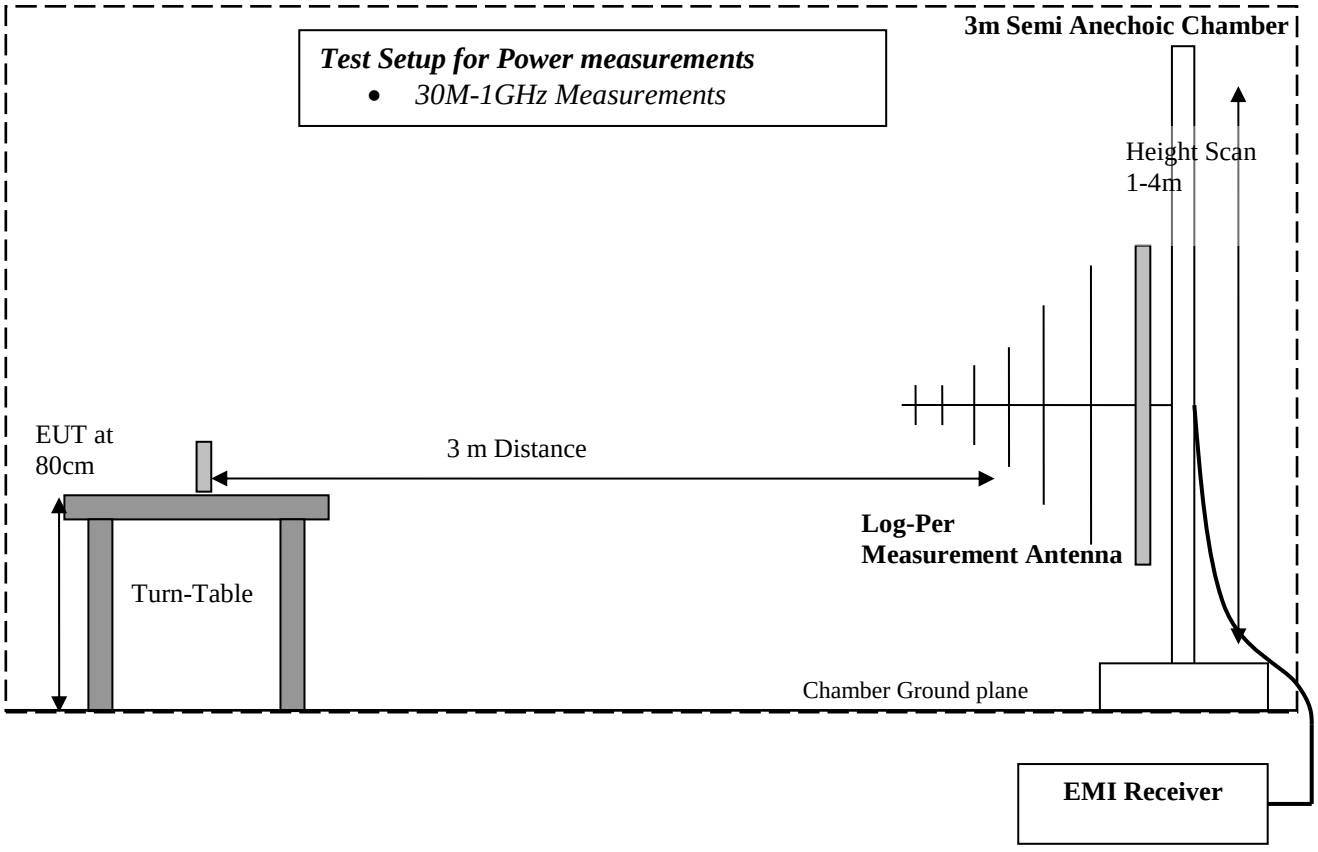


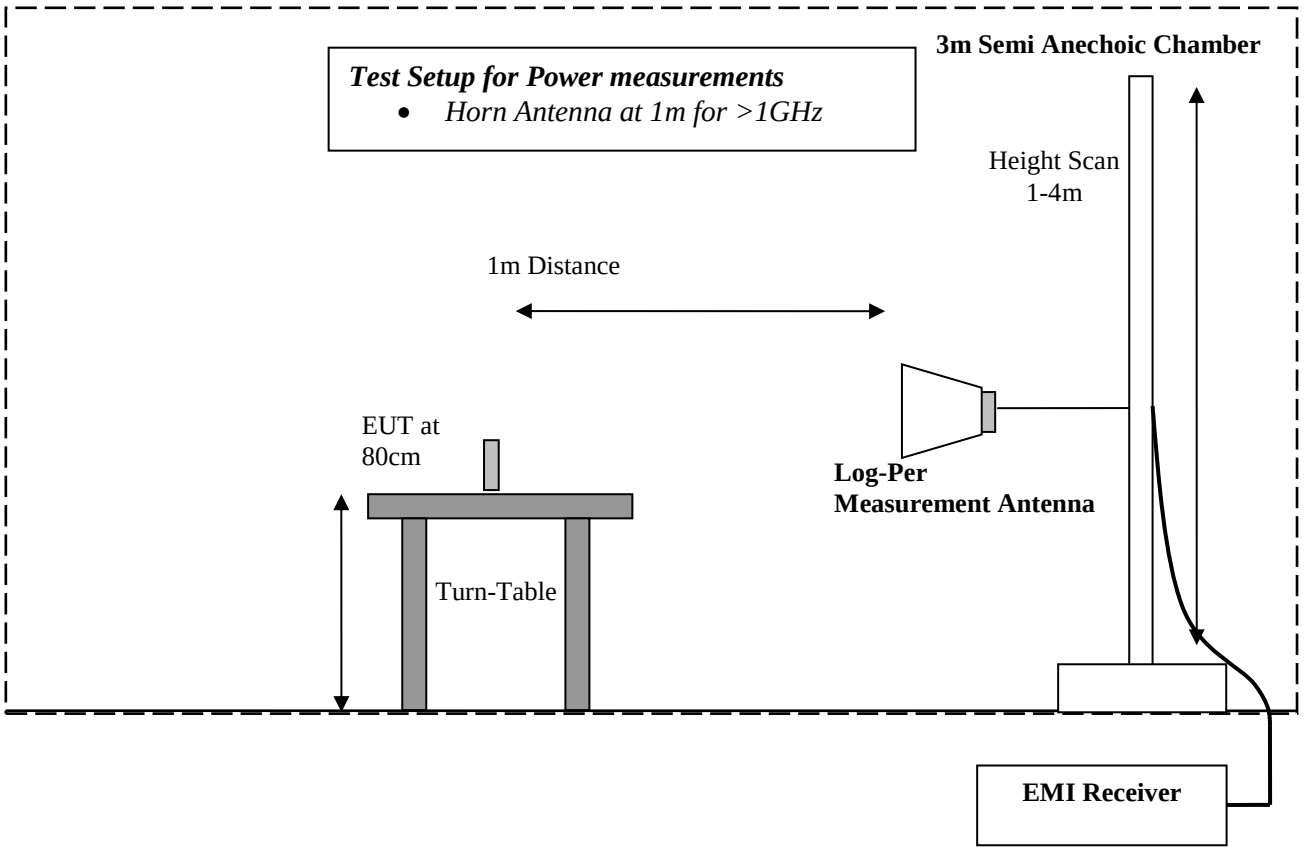
7 Test Equipment and Ancillaries used for tests.

No.	Equipment Name	Manufacturer	Type/model	Serial No.	Cal Date	Cal Interval
3m Semi- Anechoic Chamber:						
	Digital Radio Comm. Tester	Rohde&Schwarz	CMU 200	101821	Jun 2013	2 Years
	EMC32 Measurement Software	Rohde&Schwarz	8.52.0	N/A	N/A	N/A
	Turn table	EMCO	2075	N/A	N/A	N/A
	MAPS Position Controller	ETS Lindgren	2092	0004-1510	N/A	N/A
	Antenna Mast	EMCO	2075	N/A	N/A	N/A
	Relay Switch Unit	Rohde&Schwarz	RSU	338964/001	N/A	N/A
	EMI Receiver/Analyzer	Rohde&Schwarz	ESU 40	100251	Sep 2013	2 Years
	1500MHz HP Filter	Filtek	HP12/1700	14c48	N/A	N/A
	2800 MHz HP Filter	Filtek	HP12/2800	14C47	N/A	N/A
	Pre-Amplifier	Miteq	JS40010260	340125	N/A	N/A
	Binconilog Antenna	EMCO	3141	0005-1186	Apr 2012	4 Years
	Horn Antenna	EMCO	3115	35114	Mar 2012	4 Years
	Horn Antenna	ETS Lindgren	3116	70497	Mar 2012	4 Years
	Spectrum Analyzer	Rohde&Schwarz	FSU	100189	Jun 2013	2 Years
	Loop Antenna 6512	ETS Lindgren	6512	49838	Mar 2014	3 Years
Ancillary equipment						
	Humidity Temperature Logger	Dickson	TM320	03280063	Apr 2013	3 Year
	Communication Antenna	IBP5-900/1940	Kathrein	N/A	N/A	N/A

8 Block Diagrams

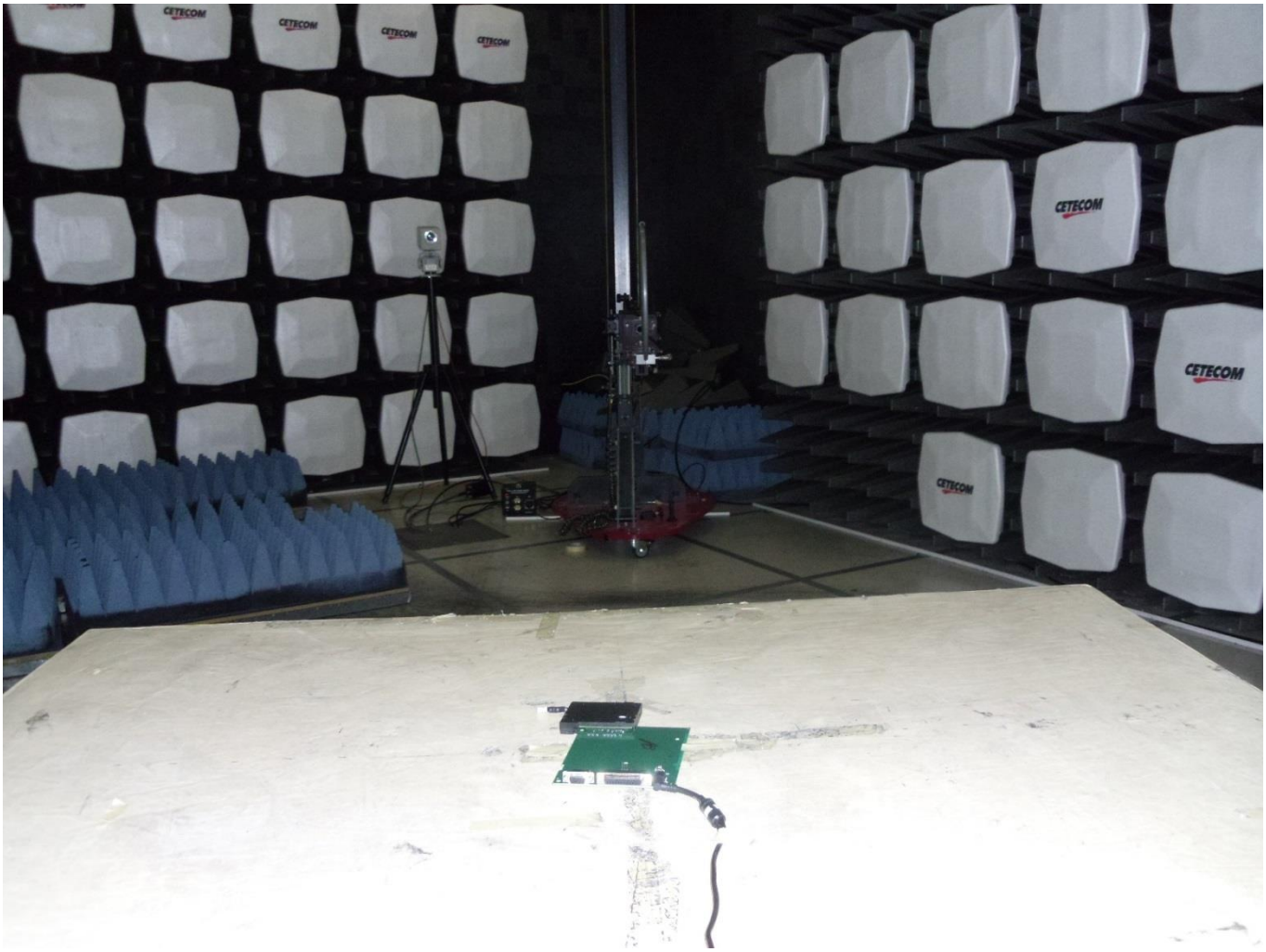




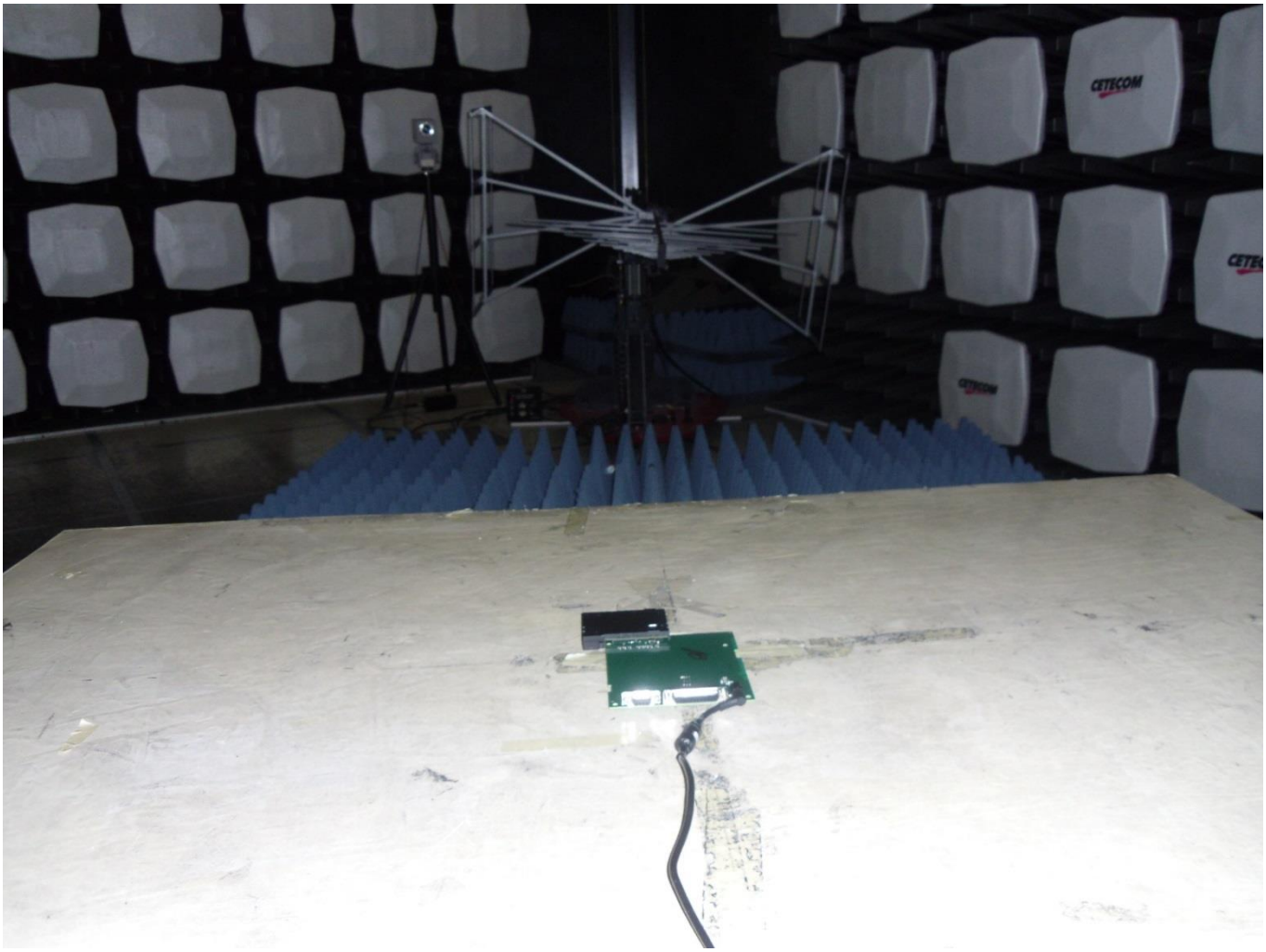

3m Semi Anechoic Chamber
Test Setup for Power measurements
Horn Antenna at 1m for >1GHz
Height Scan
1-4m
1m Distance
EUT at
80cm
Log-Per
Measurement Antenna
Turn-Table
EMI Receiver

9 Setup Photos and EUT photo

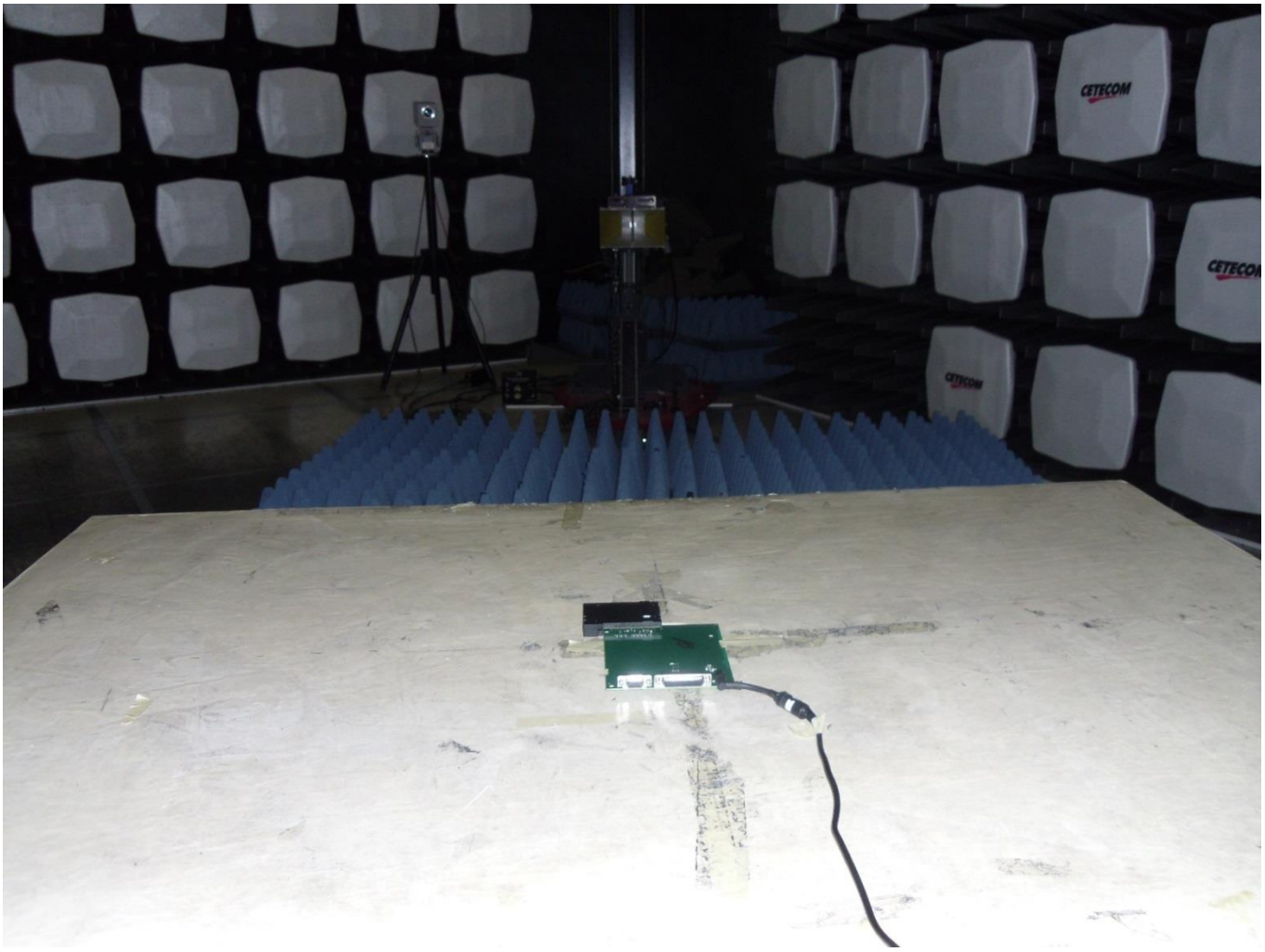
9.1 Setup below 30MHz



9.2 Setup above 30MHz to 1GHz

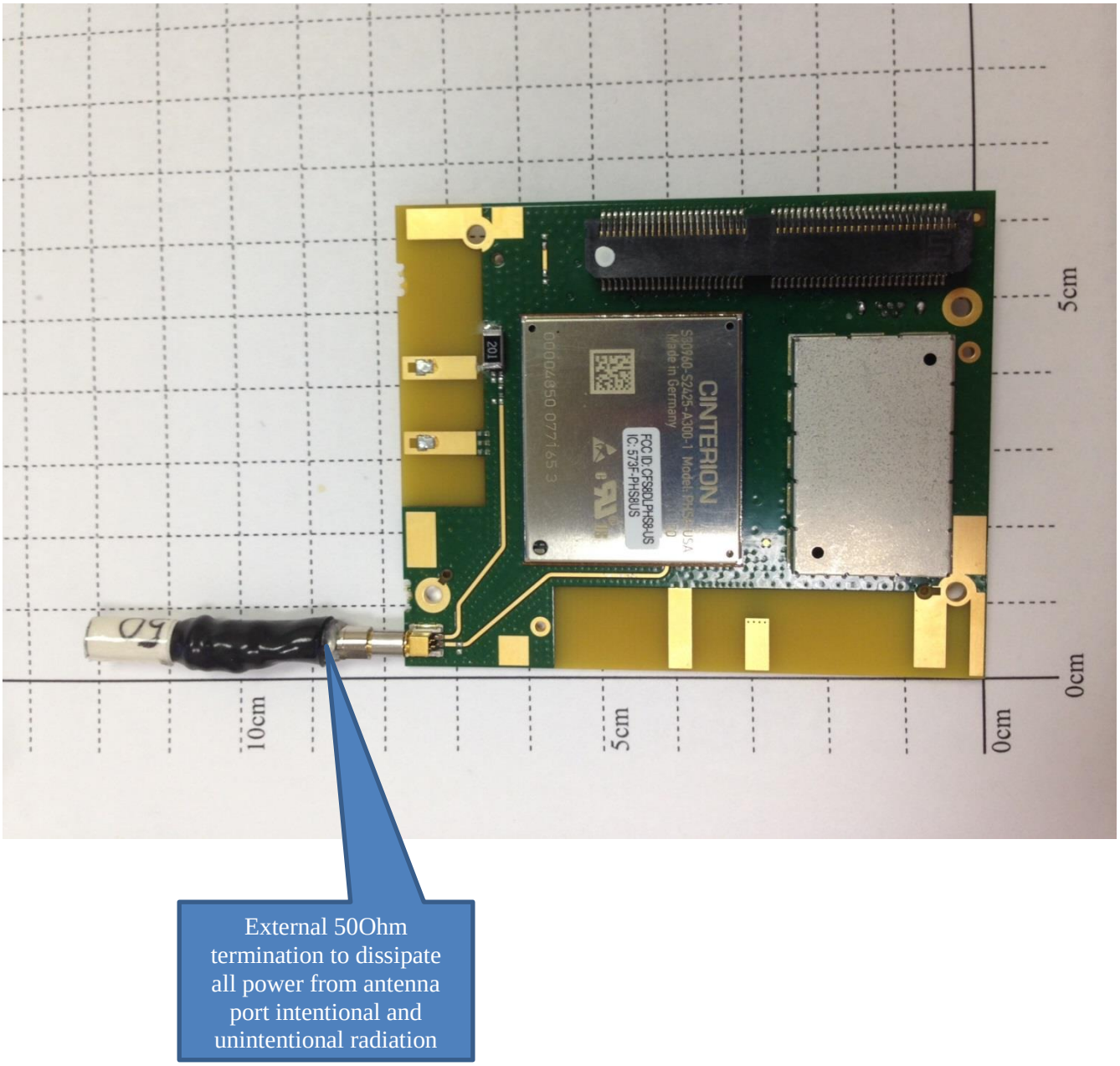


9.3 Setup above 1GHz

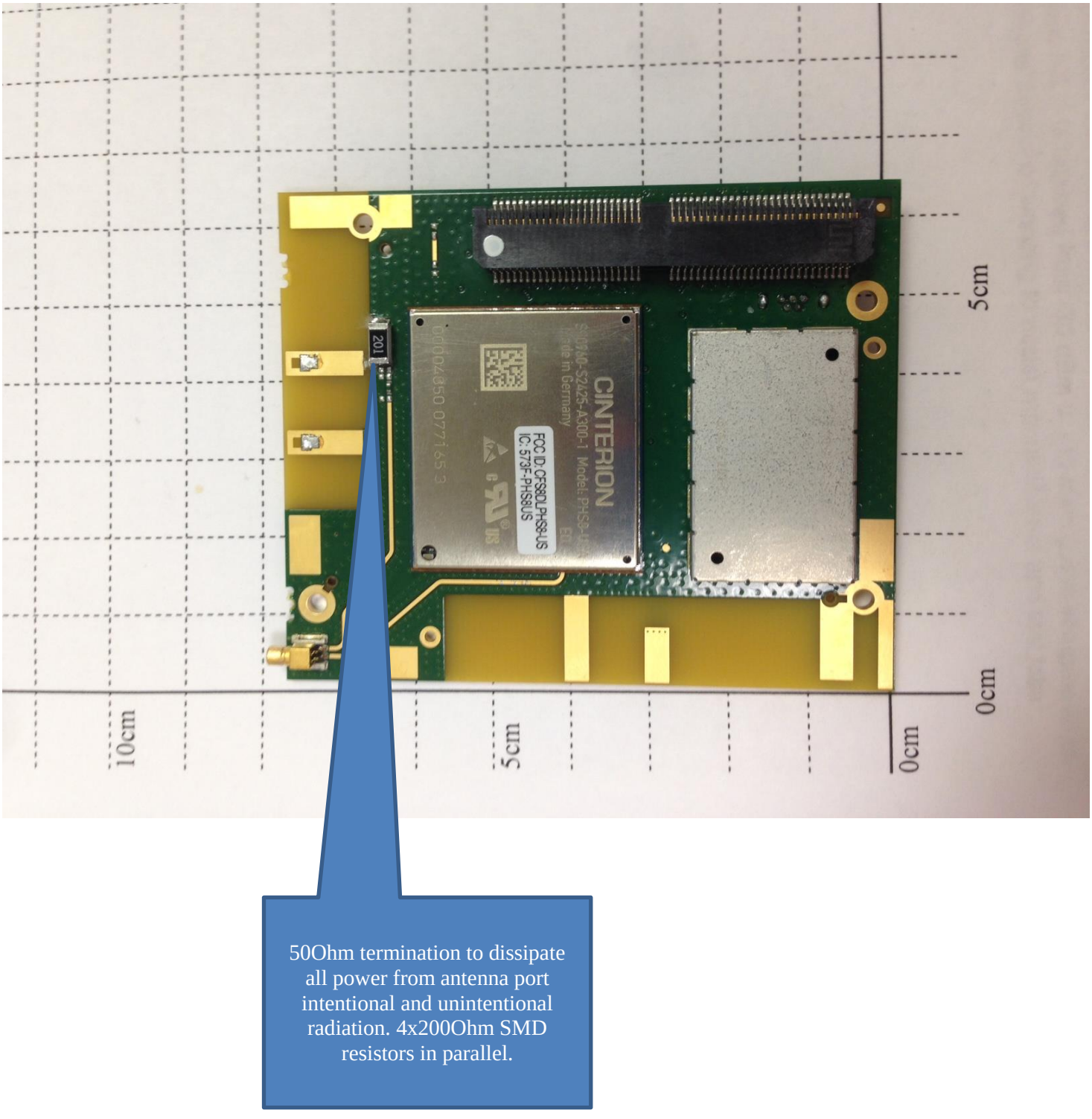


9.4 Setup above 18GHz

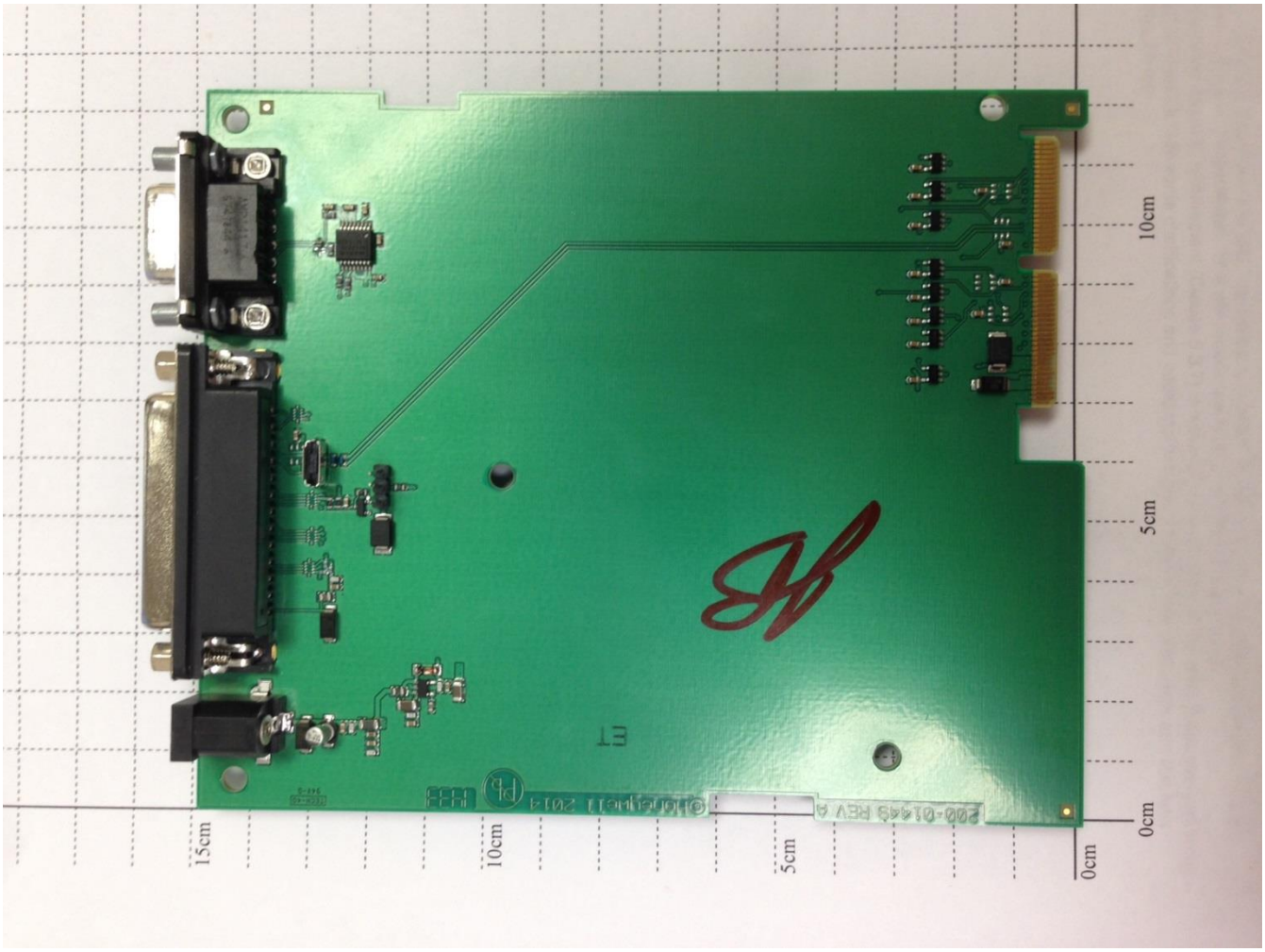
9.5 EUT Setup for external antenna trace measurements



9.6 EUT Setup for internal antenna trace measurements



9.7 R&D board used to supply power to EUT



9.8 EUT assembled

10 Revision History

Date	Report Name	Changes to Report	Report prepared by
2015-4-22	EMC_HONE2_045_15001_FCC _22_24_LYRIC_3G	First version	Franz Engert