FCC Test Report

FOR:

Model Number: 0247901
Model Name: nuLink! 23xx
Personal Navigation Device

FCC ID: IPH-0247901

47 CFR Part 2, 22, 24

TEST REPORT #: EMC_GARMI_033_11001_FCC22_24
DATE: 2011-03-15

Bluetooth Qualification Test Facility (BQTF)

CTIA Authorized Test Lab
LAB CODE 20020328-00

FCC listed: A2LA Accredited

IC recognized # 3462B-1

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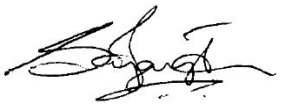
1 Assessment

The following device was tested against the applicable criteria specified in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations.
No deviations were ascertained during the course of the tests performed.

Company	Description	Model #
Garmin International	Connected Personal Navigation Device	0247901

Responsible for Testing Laboratory:

Date	Section	Name	Signature
2011-03-15	Compliance	Sajay Jose (Test Lab Manager)	

Responsible for the Report:

Date	Section	Name	Signature
2011-03-15	Compliance	Josie Sabado (EMC Engineer)	Josie Sabado I am the author of this document

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Test Lab Director:	Heiko Strehlow
Responsible Project Leader:	Rami Saman

2.2 Identification of the Client

Applicant's Name:	Garmin International Inc.
Street Address:	1200 E. 151st Street
City/Zip Code	Olathe KS 66062
Country	USA
Contact Person:	Van Ruggles
Phone No.	913.397.8448
Fax:	913.397.8282
e-mail:	van.ruggles@garmin.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Garmin International Inc.
Manufacturers Address:	No. 68 Jangshu 2nd Road
City/Zip Code	Shijr, Taipei County
Country	Taiwan

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Marketing Name:	nuLink! 23xx
Model No:	0247901
Product Type:	Connected Personal Navigation Device with Quadband GSM/GPRS/EGPRS cellular modem and GPS Receiver.
Hardware Revision :	6.0
Software Revision :	2.00
FCC-ID:	IPH-0247901
Module Information:	Sierra Wireless SL6087 HW: 210 SW: 7.44.1
Frequency:	GSM 850: 824.2-848.8MHz; PCS 1900: 1850.2-1909.8MHz
Type(s) of Modulation:	GMSK; 8-PSK;
Number of channels:	GSM850: 125 and PCS 1900: 300
Antenna Type:	IFA Antenna 0dBi Peak gain 824-960MHz; 2 dBi Peak gain 1710-1990MHz
Power Supply:	Lithium battery pack (dedicated), 5.0 VDC;
Operating Temperature Range:	-20ºC to 55ºC
Prototype / Production unit:	Prototype Sample

Notes:
Model number 0247901 is sold under 3 marketing names- nuLink! 2390, nuLink! 2340 and nuLink! 2320. The only difference between these models is in the internal memory size.
All testing was performed on the 2390 model and test data reported in this document is applicable for the 2340 and 2320 models.

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	HW Version	SW Version	Model	Notes
1	25A000268	6	2.00	nuLink! 2390	Radiated Sample
2	25A000263	6	2.00	nuLink! 2390	Radiated Sample
3	25A000230	6	2.00	nuLink! 2390	Radiated Sample
4	25A000267	4	2.00	nuLink! 2390	Conducted Sample

3.3 Identification of Accessory equipment

AE #	Type	Manufacturer	Model	Serial Number
1	Vehicle Charger	Garmin	FA-0501000CB	F10102022462
2	Car Holder	Garmin	N/A	N/A
3	USB Cable	Garmin	N/A	N/A
4	Laptop Computer	Dell	E6400	14686084801

4 Subject of Investigation

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in the following test standards:

- 47 CFR Part 2: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission Frequency allocations and radio treaty matters; general rules and regulations.
- 47 CFR Part 22: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission subchapter B- common carrier services; Part 22- Public mobile services
- 47 CFR Part 24: Title 47 of the Code of Federal Regulations: Chapter I-Federal Communications Commission subchapter B- common carrier services; Part 24- Personal communication services

This test report is to support a request for new equipment authorization under the FCC ID: **IPH-0247901.**
All testing was performed on the product referred to in Section 3 as EUT.

5 Summary of Measurement Results

850 Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §22.913 (a)	RF Output Power	Nominal	GSM 850	☐	☐	☐	■	Complies
§2.1055 §22.355	Frequency Stability	Nominal	GSM 850	☐	☐	☐	■	Complies
§2.1049 §22.917(b)	Occupied Bandwidth	Nominal	GSM 850	☐	☐	☐	■	Complies
§2.1051 §22.917	Band Edge Compliance	Nominal	GSM 850	☐	☐	☐	■	Complies
§2.1051 §22.917	Conducted Spurious Emissions	Nominal	GSM 850	☐	☐	☐	■	Complies
§2.1053 §22.917	Radiated Spurious Emissions	Nominal	GSM 850	■	☐	☐	☐	Complies
§15.107 §15.207	Line Conducted Emissions	Nominal	GSM 850	■	☐	☐	☐	Complies
§2.1053 §15.109	Receiver Emissions-Radiated	Nominal	RX Mode	■	☐	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed.

1. Tests marked NP are leveraged from the SL6087 Module test report #SHEMO10050062301 issued by SGS-CSTC Standards technical Services (Shanghai) Co., Ltd. On May 31, 2010.

1900 Band:

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
§2.1046 §24.232 (a)	RF Output Power	Nominal	GSM 1900	☐	☐	☐	■	Complies
§2.1055 §24.235	Frequency Stability	Nominal	GSM 1900	☐	☐	☐	■	Complies
§2.1049 §24.238(b)	Occupied Bandwidth	Nominal	GSM 1900	☐	☐	☐	■	Complies
§2.1051 §24.238	Band Edge Compliance	Nominal	GSM 1900	☐	☐	☐	■	Complies
§2.1051 §24.238	Conducted Spurious Emissions	Nominal	GSM 1900	☐	☐	☐	■	Complies
§2.1053 §24.238	Radiated Spurious Emissions	Nominal	GSM 1900	■	☐	☐	☐	Complies
§15.107 §15.207	Line conducted Emissions	Nominal	GSM 1900	■	☐	☐	☐	Complies
§2.1053 §15.109	Receiver Emissions-Radiated	Nominal	RX Mode	■	☐	☐	☐	Complies

Note: NA= Not Applicable; NP= Not Performed.

1. Tests marked NP are leveraged from the SL6087 Module test report #SHEMO10050062301 issued by SGS-CSTC Standards technical Services (Shanghai) Co., Ltd. On May 31, 2010.

6 Measurements

6.1 RF Power Output

6.1.1 References

FCC: CFR Part 2.1046, CFR Part 22.913, CFR Part 24.232

6.1.2 Measurement requirements:

6.1.2.1 FCC 2.1046: 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.

6.1.3 Limits:

6.1.3.1 FCC 22.913 (a) Effective radiated power limits.

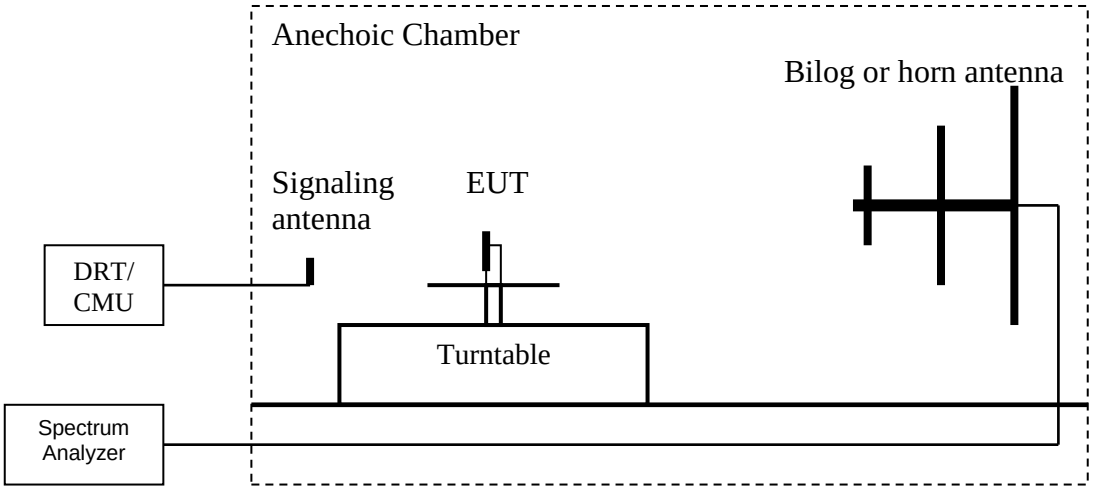
The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

6.1.3.2 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.

6.1.4 Radiated Output Power Measurement procedure

Ref: TIA-603C 2004 -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 center of the turn table.
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 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=5MHz
(**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.)

6.1.5 RF Power Output 850MHz band

Limit: FCC: Nominal Peak Output Power < 38.45 dBm (7W)

Measurement Uncertainty (Conducted): ±0.5 dB
Measurement Uncertainty (Radiated): ±3.0 dB

GSM 850: GMSK Mode	
Frequency (MHz)	**Radiated Power ERP (dBm)**
824.2	30.5
836.6	31.2
848.8	31.9

EGPRS 850: 8PSK Mode	
Frequency (MHz)	**Radiated Power ERP (dBm)**
824.2	28.0
836.6	29.0
848.8	29.9

6.1.5.1 Measurement Result

Pass.

6.1.6 RF Power Output 1900MHz band

Limit: Nominal Peak Output Power < 33 dBm (2W)

Measurement Uncertainty (Conducted): ±0.5 dB
Measurement Uncertainty (Radiated): ±3.0 dB

GSM 1900: GMSK Mode	
Frequency (MHz)	**Radiated Power EIRP (dBm)**
1850.2	31.6
1880.0	30.1
1909.8	30.5

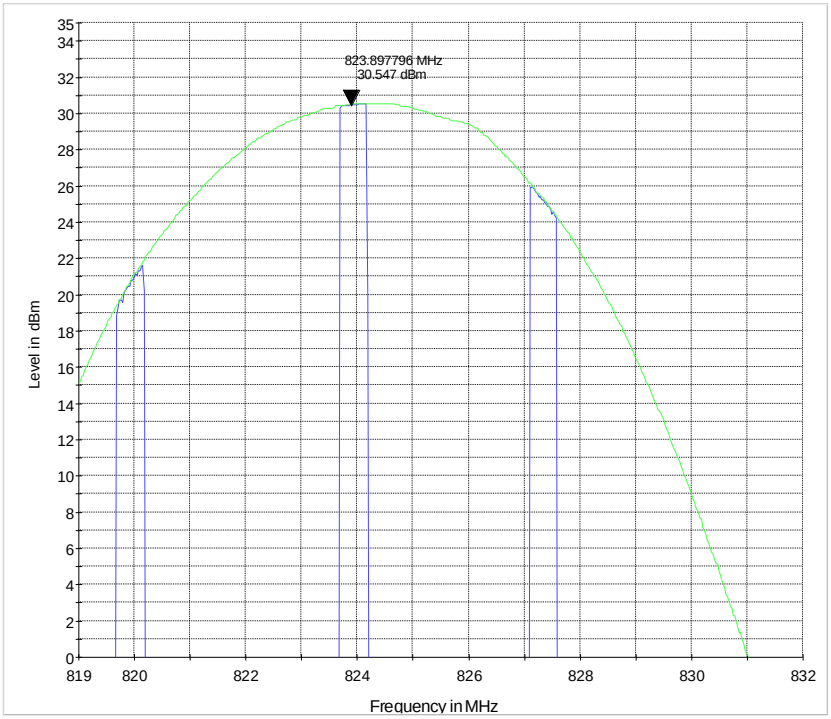
EGPRS 1900: 8PSK Mode	
Frequency (MHz)	**Radiated Power EIRP (dBm)**
1850.2	30.6
1880.0	29.7
1909.8	29.7

6.1.6.1 Measurement Result

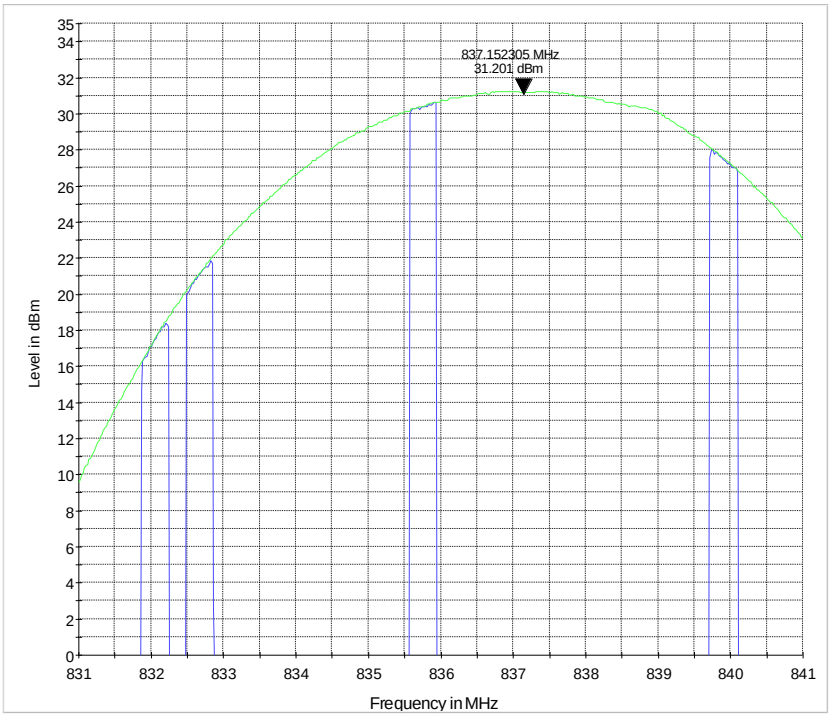
Pass.

6.1.7 Results

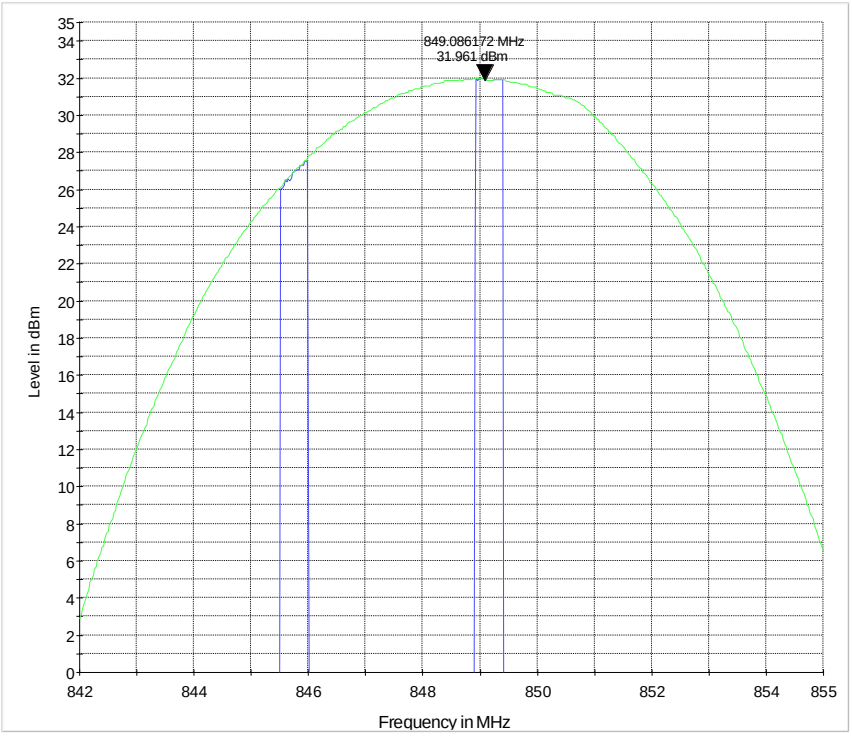
ERP (GSM 850) CHANNEL 128



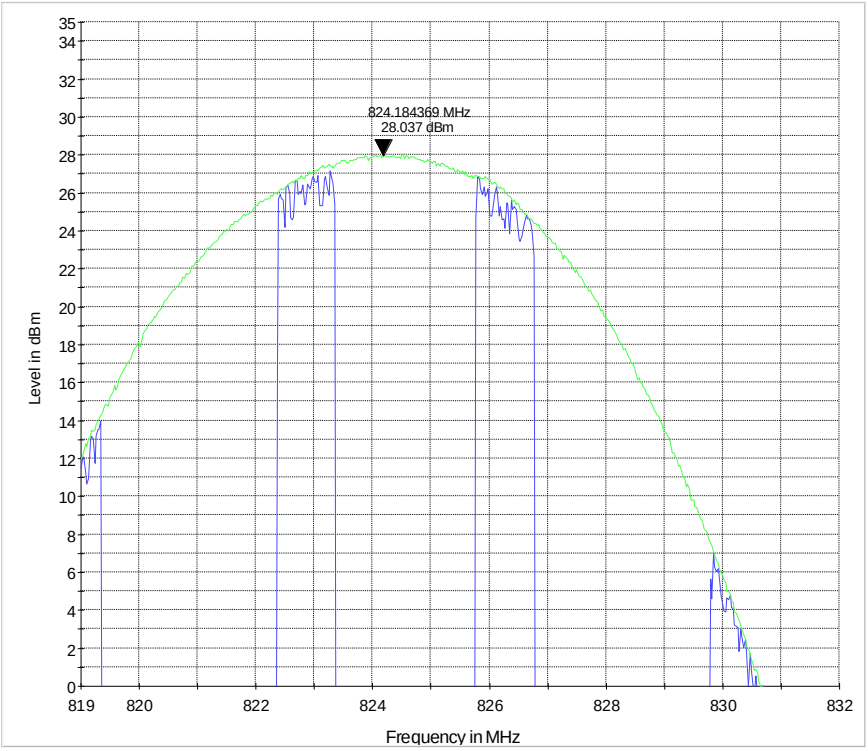
ERP (GSM 850) CHANNEL 190



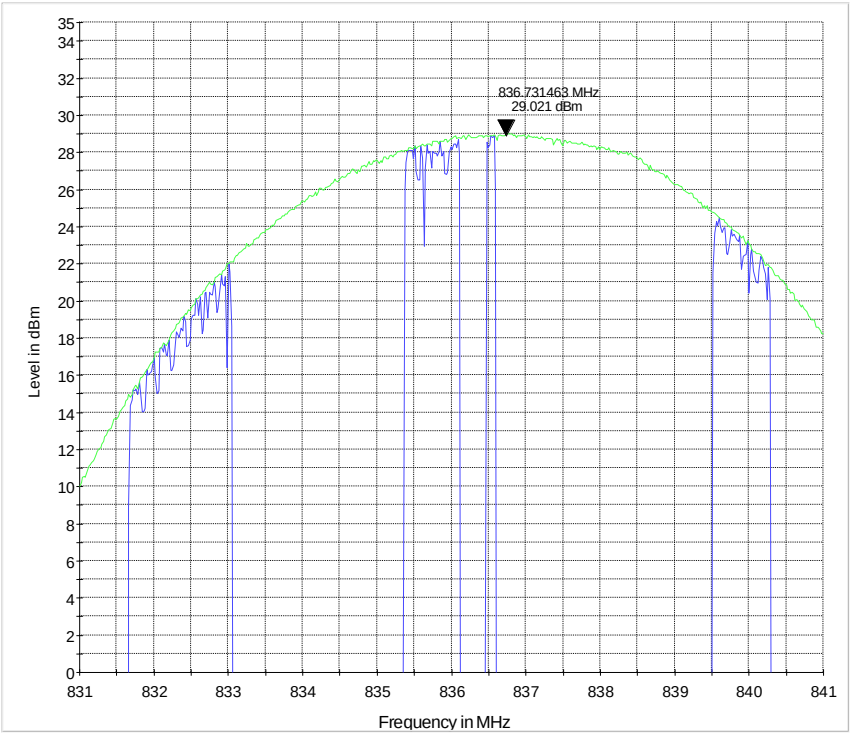
ERP (GSM 850) CHANNEL 251



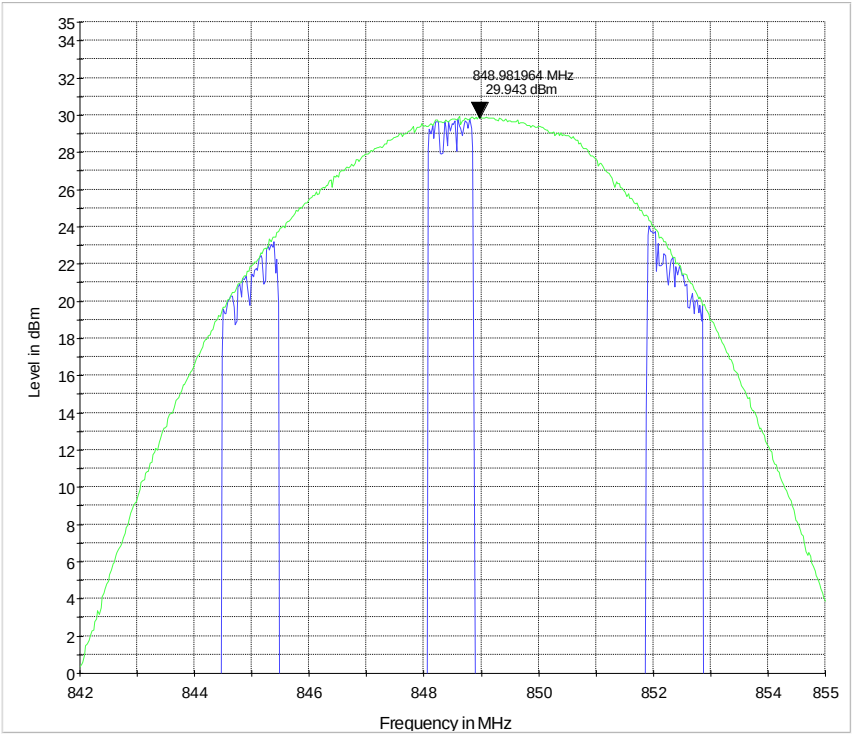
ERP (EGPRS 850) CHANNEL 128



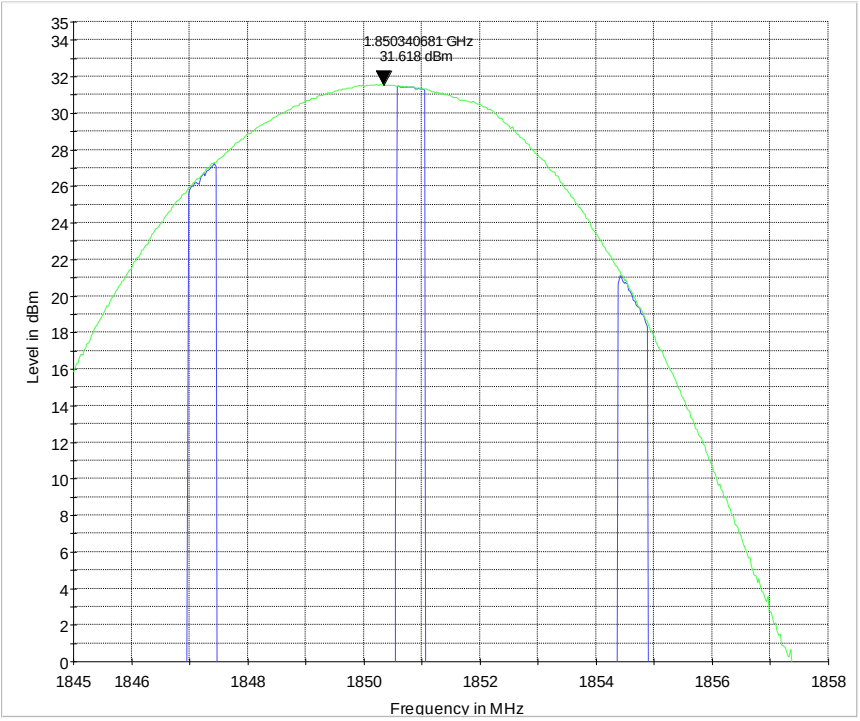
ERP (EGPRS 850) CHANNEL 190



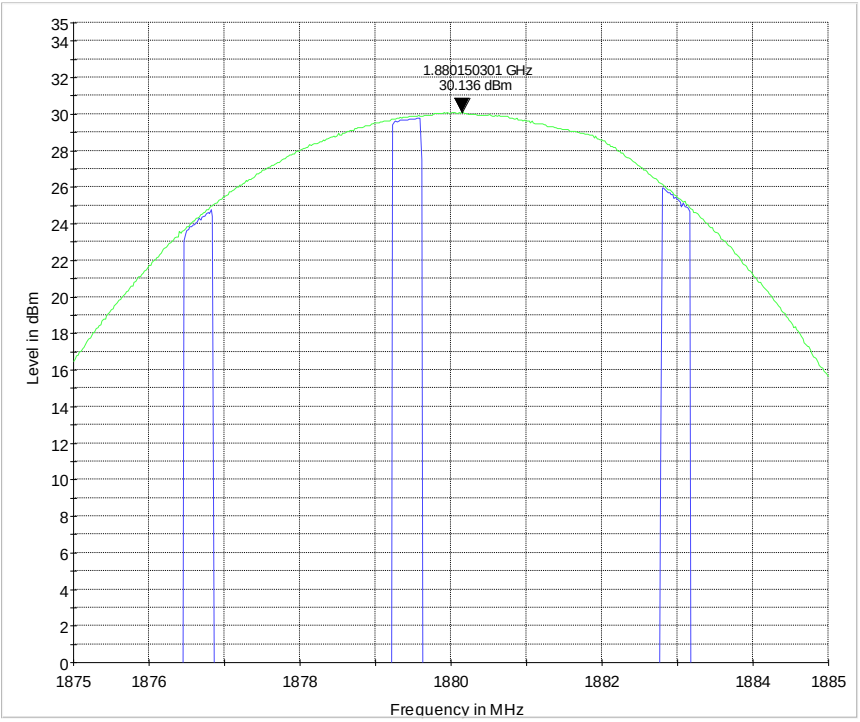
ERP (EGPRS 850) CHANNEL 251



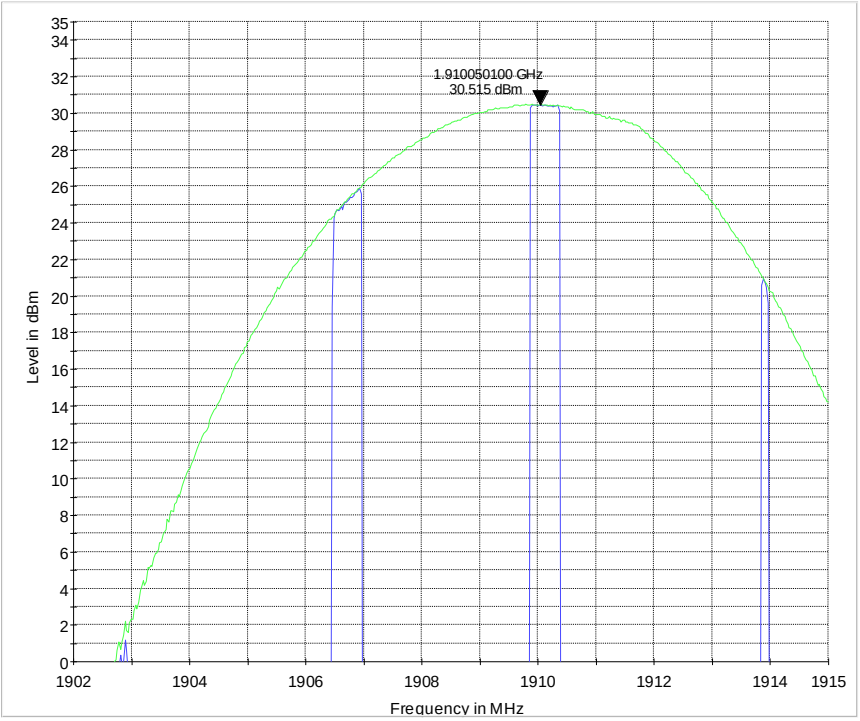
EIRP (PCS-1900) CHANNEL 512



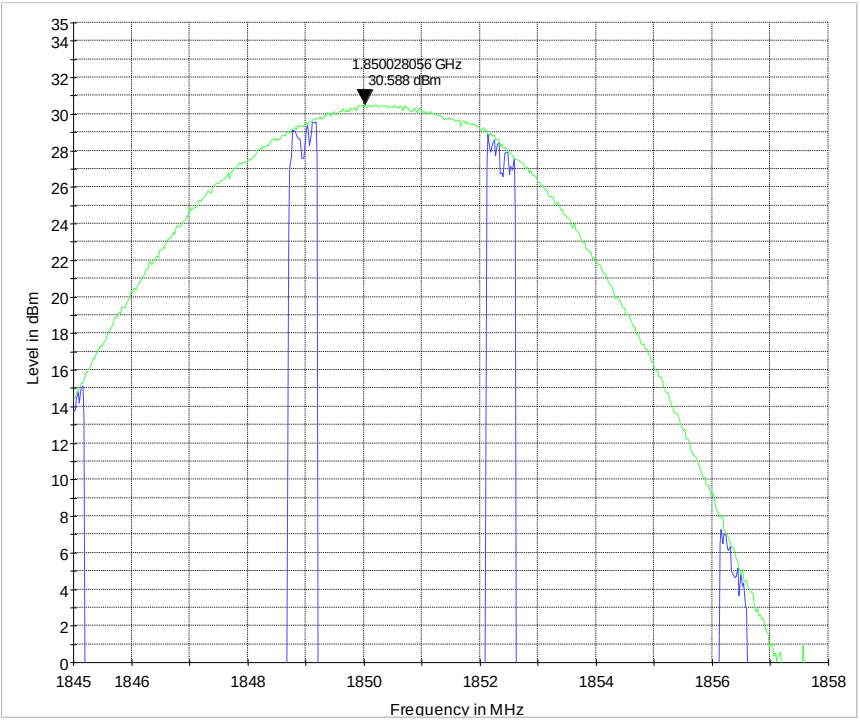
EIRP (PCS-1900) CHANNEL 661



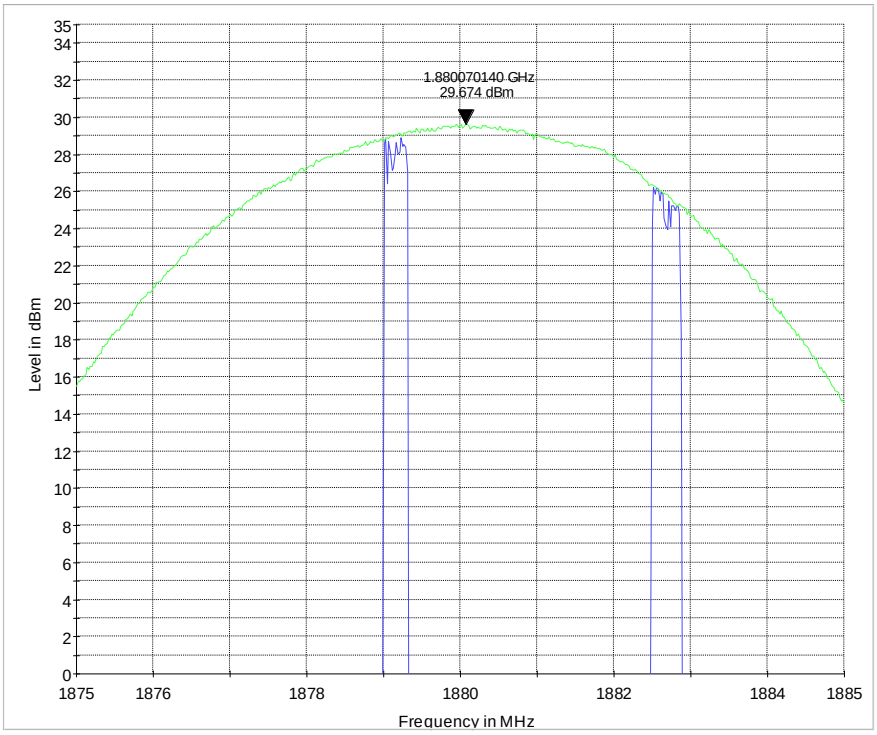
EIRP (PCS-1900) CHANNEL 810



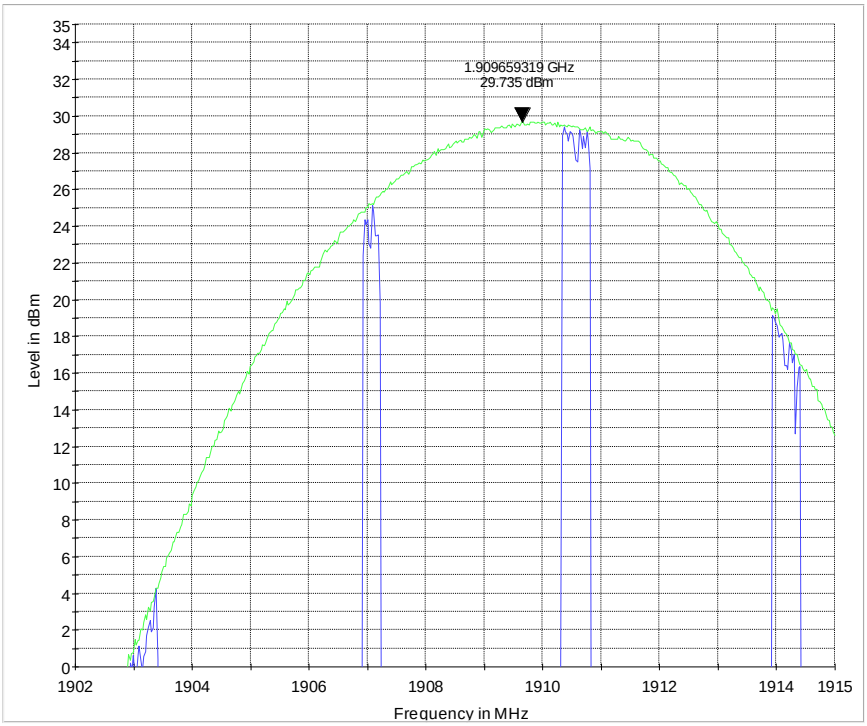
EIRP (EGPRS 1900) CHANNEL 512



EIRP (EGPRS 1900) CHANNEL 661



EIRP (EGPRS 1900) CHANNEL 810



6.2 Spurious Emissions Radiated

6.2.1 References

FCC: CFR Part 2.1053, CFR Part 22.917, CFR Part 24.238

6.2.2 Measurement requirements:

6.2.2.1 FCC 2.1053: Field strength of spurious radiation.

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.

6.2.3 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.

6.2.3.1 FCC 22.917 Emission limitations for cellular equipment.

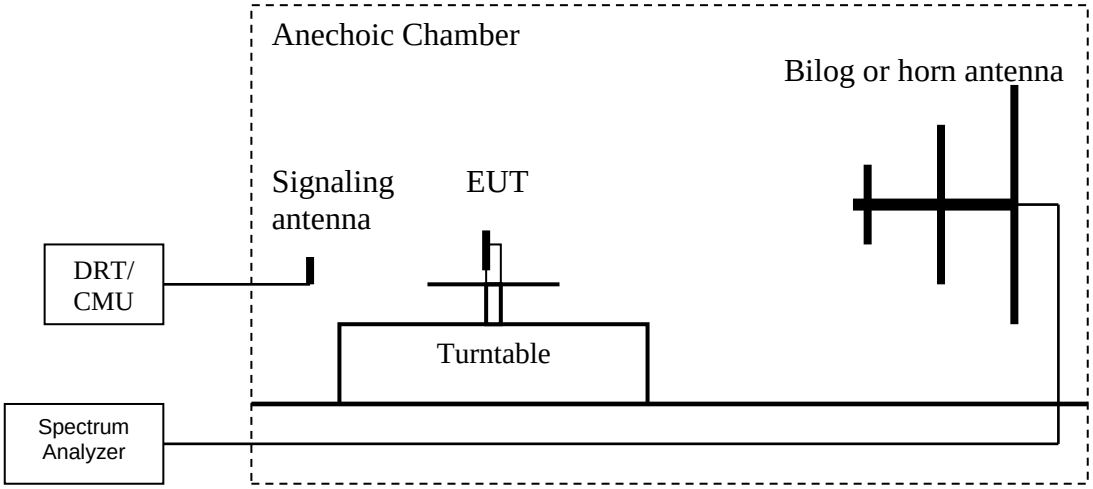
The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands 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.

6.2.3.2 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.

6.2.4 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 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.
    (N**ote:** 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: RBW=VBW=1MHz

Measurement Survey:

The site is constructed in accordance with ANSI C63.4 requirements and is recognized by the FCC to be in compliance for a 3m site. The spectrum is scanned from 30MHz to the 10th harmonic of the highest frequency generated by the EUT.
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.

Radiated emission measurements were made only with Circuit Switched mode GMSK modulation because this mode represents the worse case emission for all the modulations for GSM. All measurements are done in horizontal and vertical antenna polarization; and on three orientations of the EUT. The plots show the worst case where it is not indicated otherwise. Unless mentioned otherwise, the peaks in the plots are from the carrier frequency.

6.2.5 Radiated out of band emissions results on EUT- Transmit Mode:

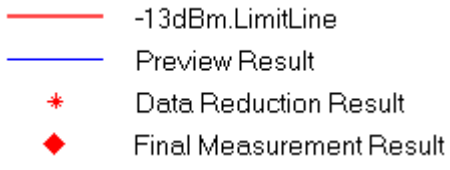
6.2.5.1 Test Results Transmitter Spurious Emission GSM850:

Harmonic	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)
1	**824.2**	-	**836.6**	-	**848.8**	-
2	**1648.4**	NF	**1673.2**	NF	**1697.6**	NF
3	**2472.6**	NF	**2509.8**	NF	**2546.4**	-28
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 Measurement Uncertainty: ±3dB						

6.2.5.2 Measurement Result

Pass.

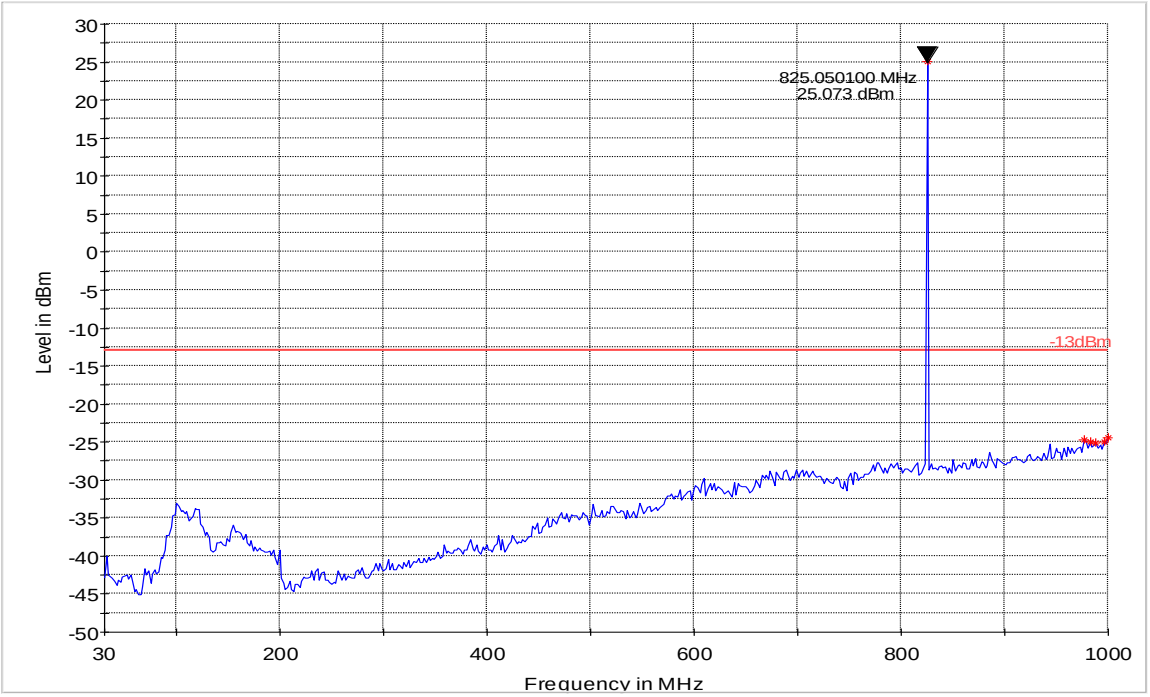
Legend for the plots:



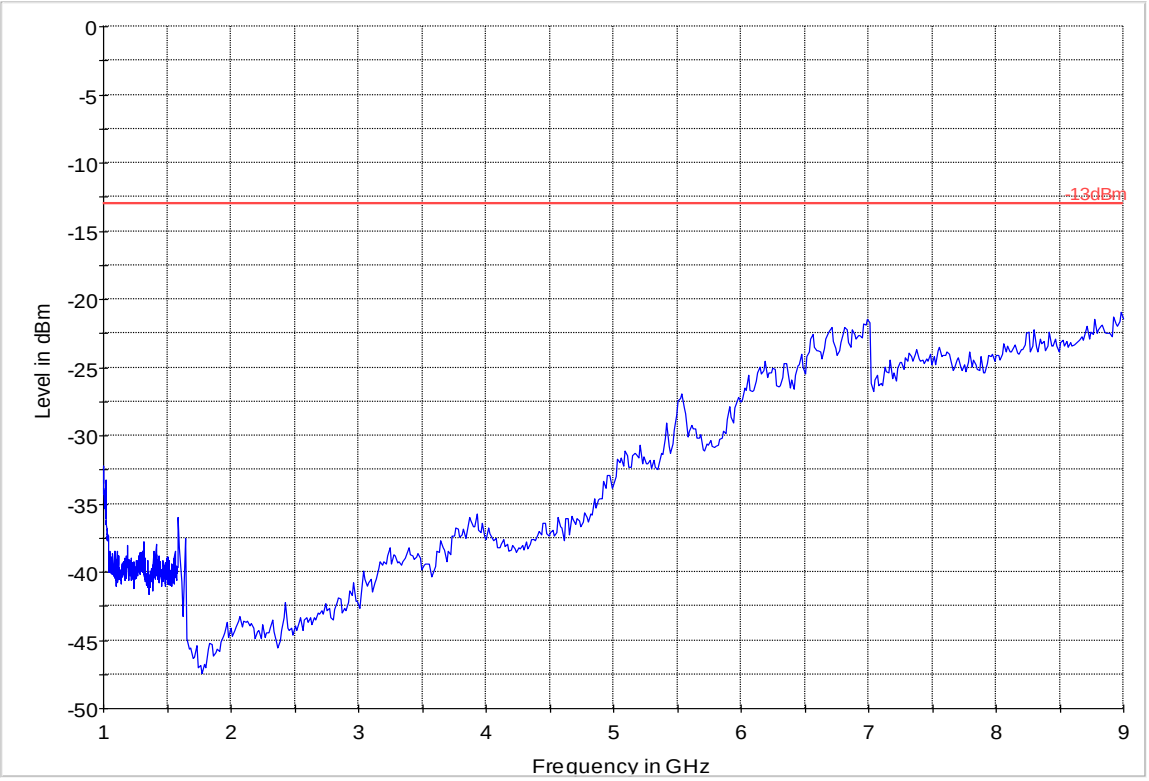
Radiated Spurious Emissions (GSM-850) Tx: Low Channel

Test results 30M-1GHz

Spur above the limit line is the TX signal

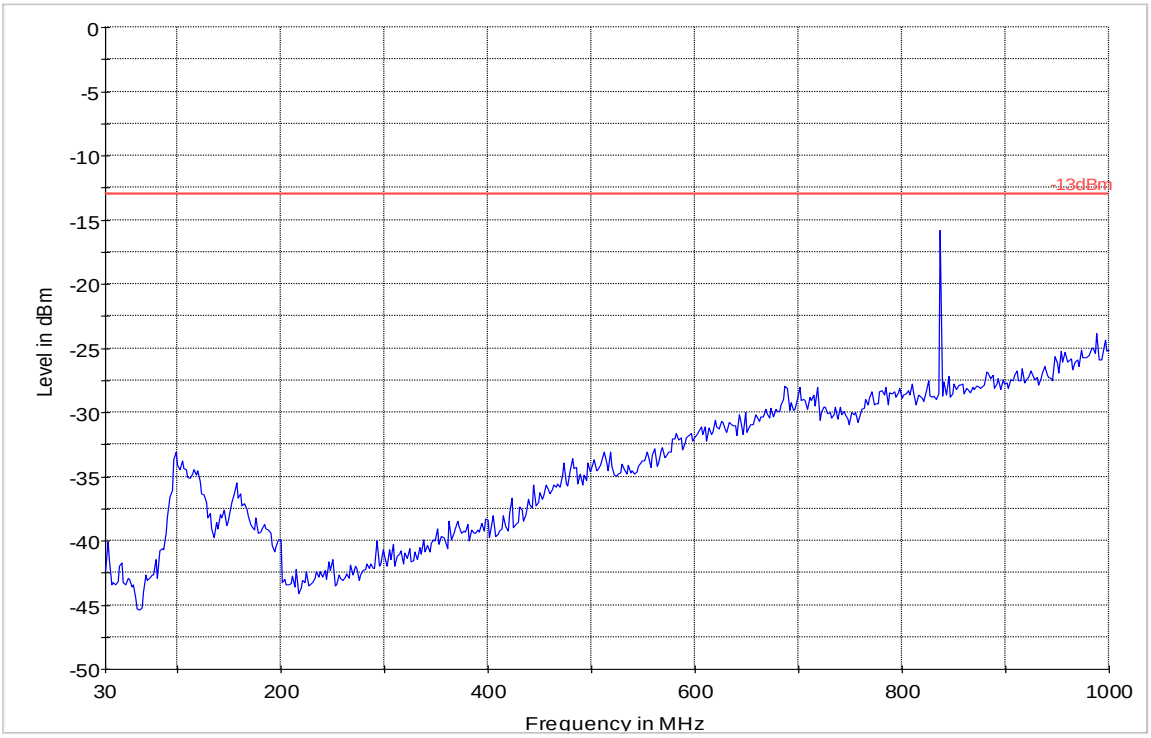


Test results 1GHz-9GHz

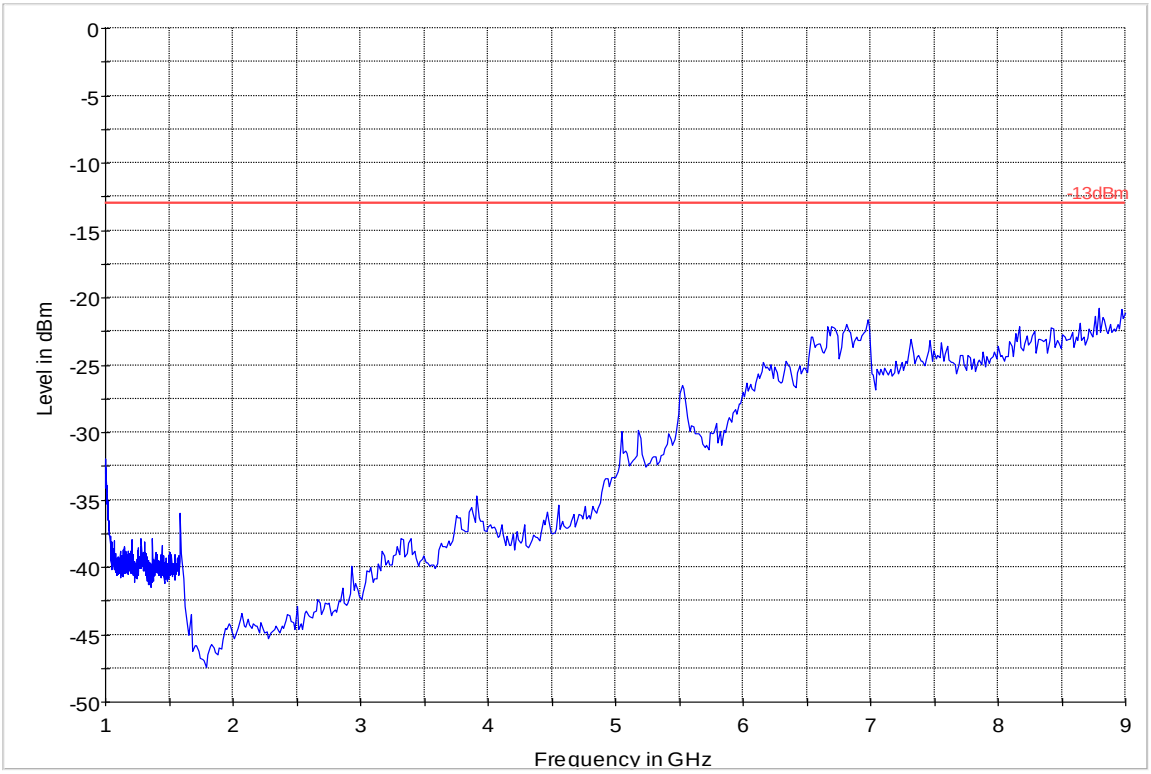


Radiated Spurious Emissions (GSM-850) Tx: Mid Channel

Test results 30M-1GHz



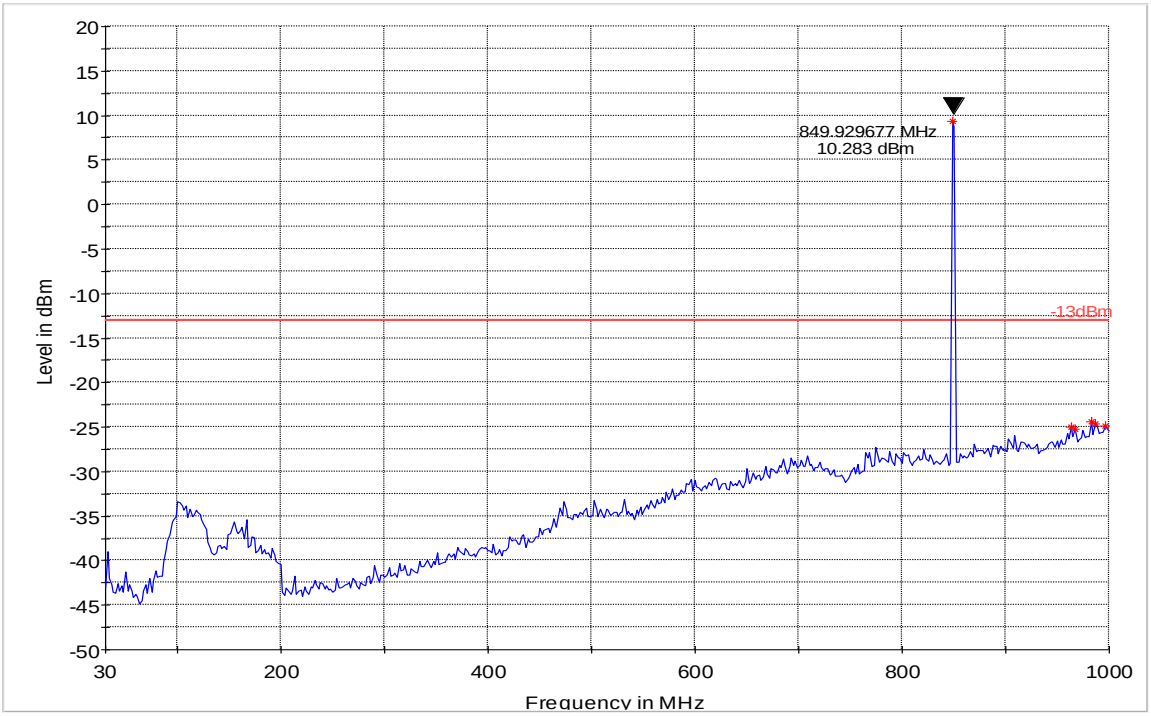
Test results 1GHz-9GHz



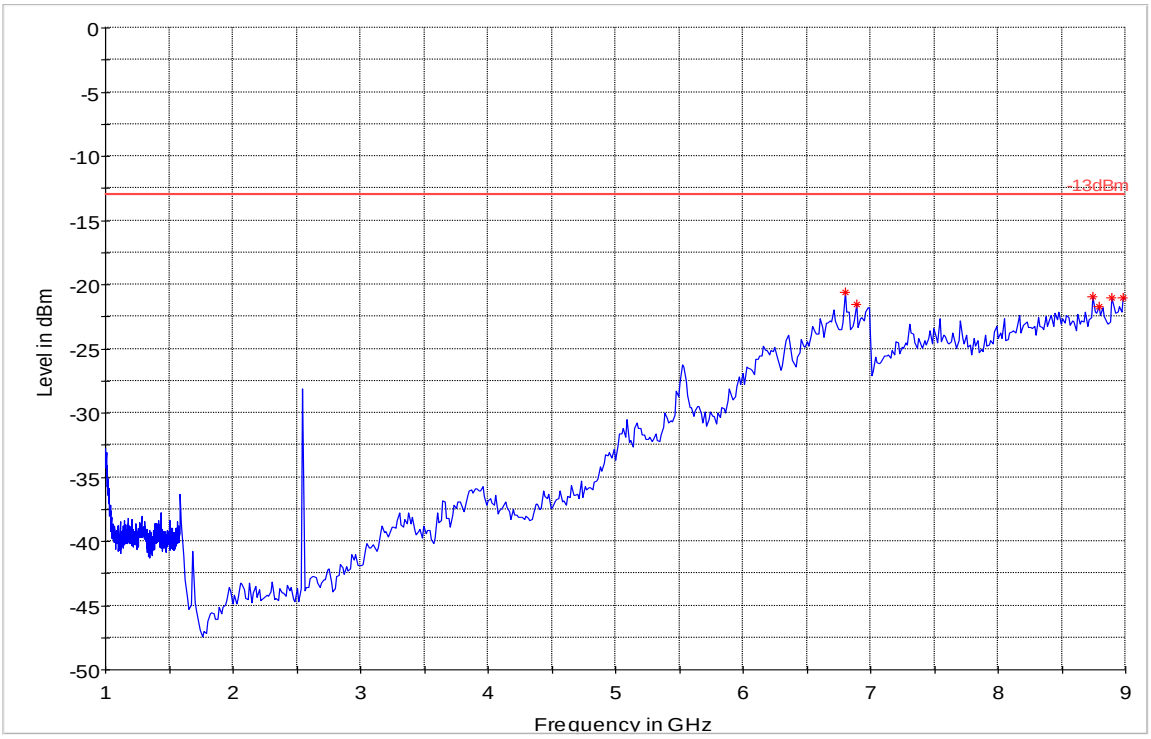
Radiated Spurious Emissions (GSM-850) Tx: High Channel

Test results 30M-1GHz

Spur above the limit line is the TX signal



Test results 1GHz-9GHz



6.2.5.3 Test Results Transmitter Spurious Emission PCS-1900:

Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
1	**1850.2**	-	**1880.0**	-	**1909.8**	-
2	**3700.4**	NF	**3760**	NF	**3819.6**	-42
3	**5550.6**	-42	**5640**	-40	**5729.4**	-32
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 Measurement Uncertainty: ±3dB						

6.2.5.4 Measurement Result

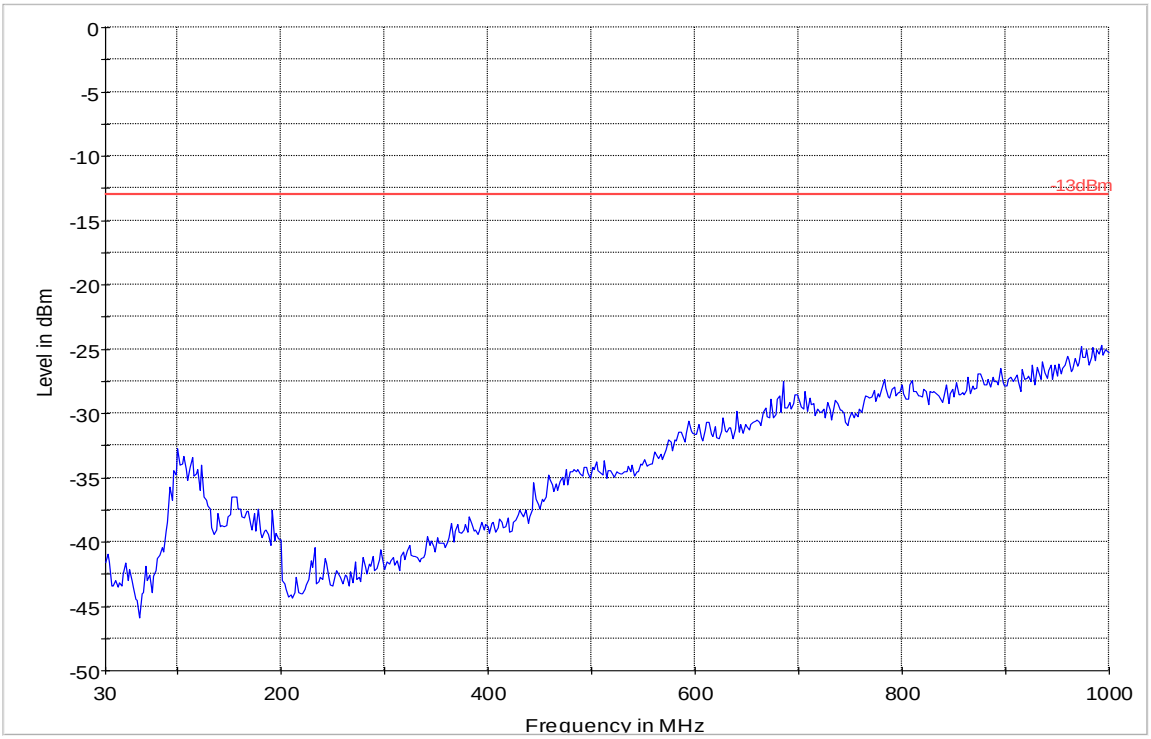
Pass.

Legend for the plots:

-13dBm.LimitLine
Preview Result
Data Reduction Result
Final Measurement Result

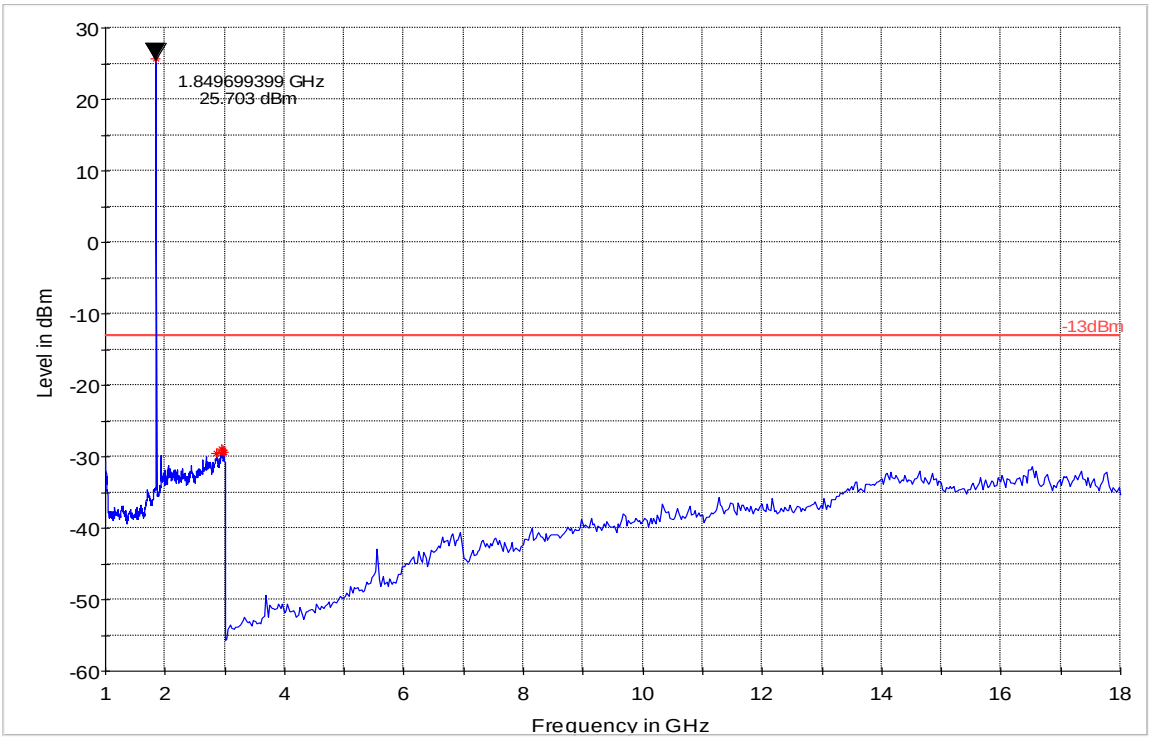
Radiated Spurious Emissions (GSM-1900) Tx: Low Channel

Test results 30M-1GHz

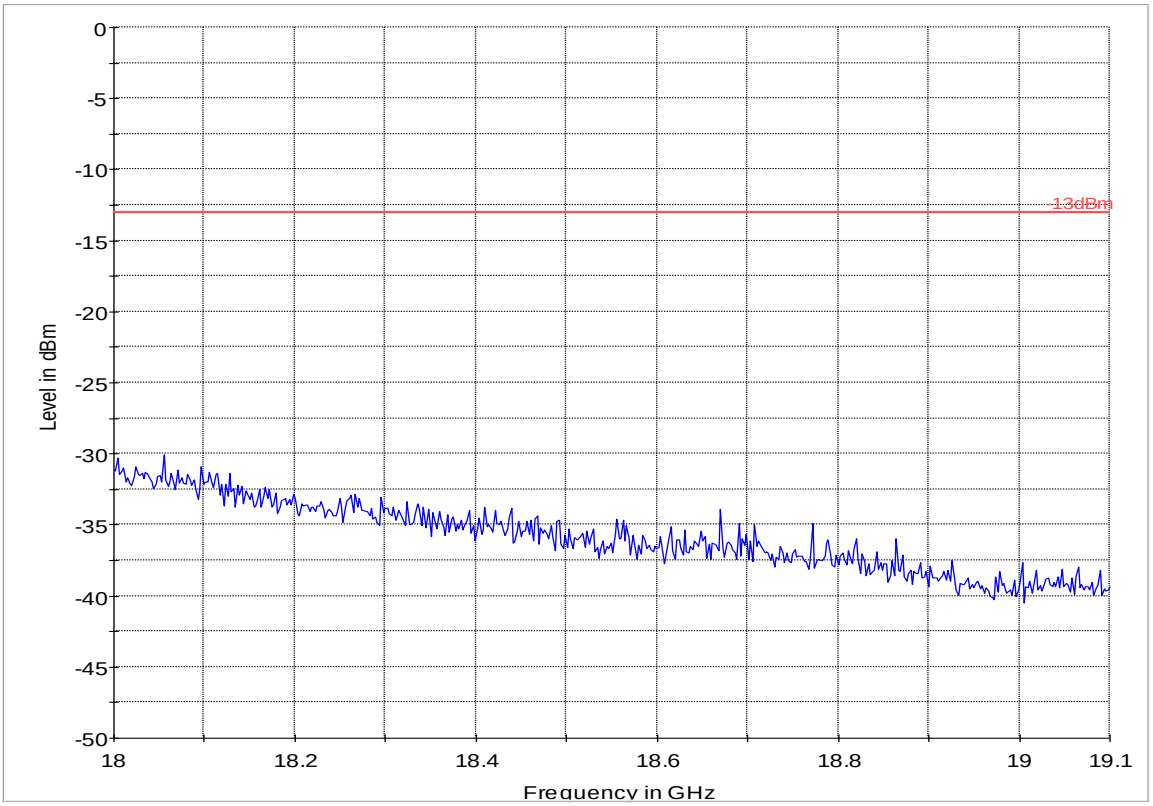


Test results 1GHz-18GHz

Spur above the limit line is the TX signal

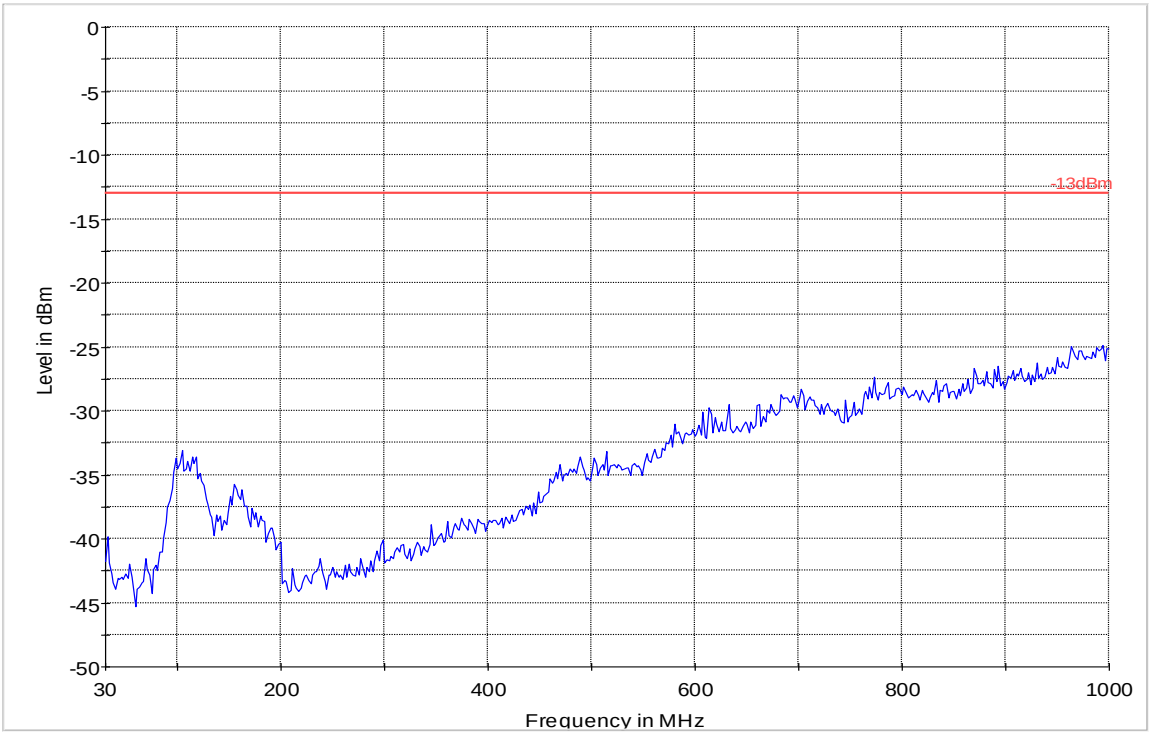


Test results 18GHz-19.1GHz



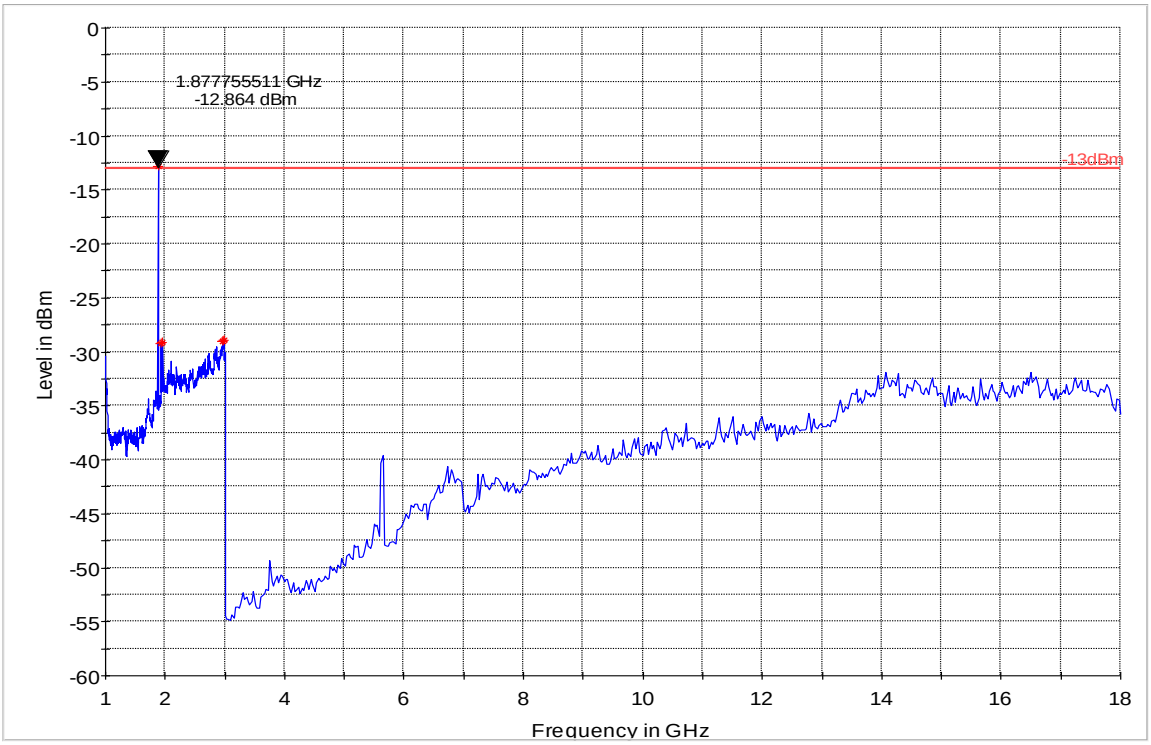
Radiated Spurious Emissions (GSM-1900) Tx: Mid Channel

Test results 30M-1GHz

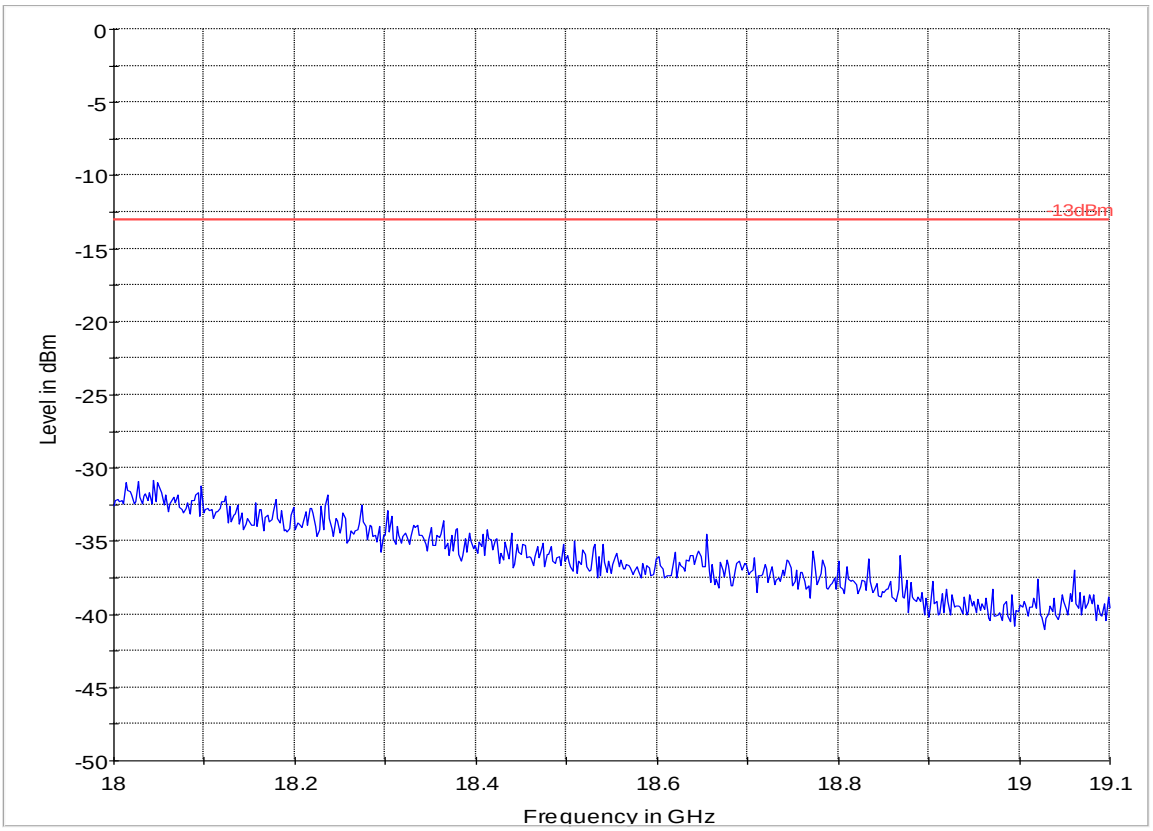


Test results 1GHz-18GHz

Spur above the limit line is the TX signal

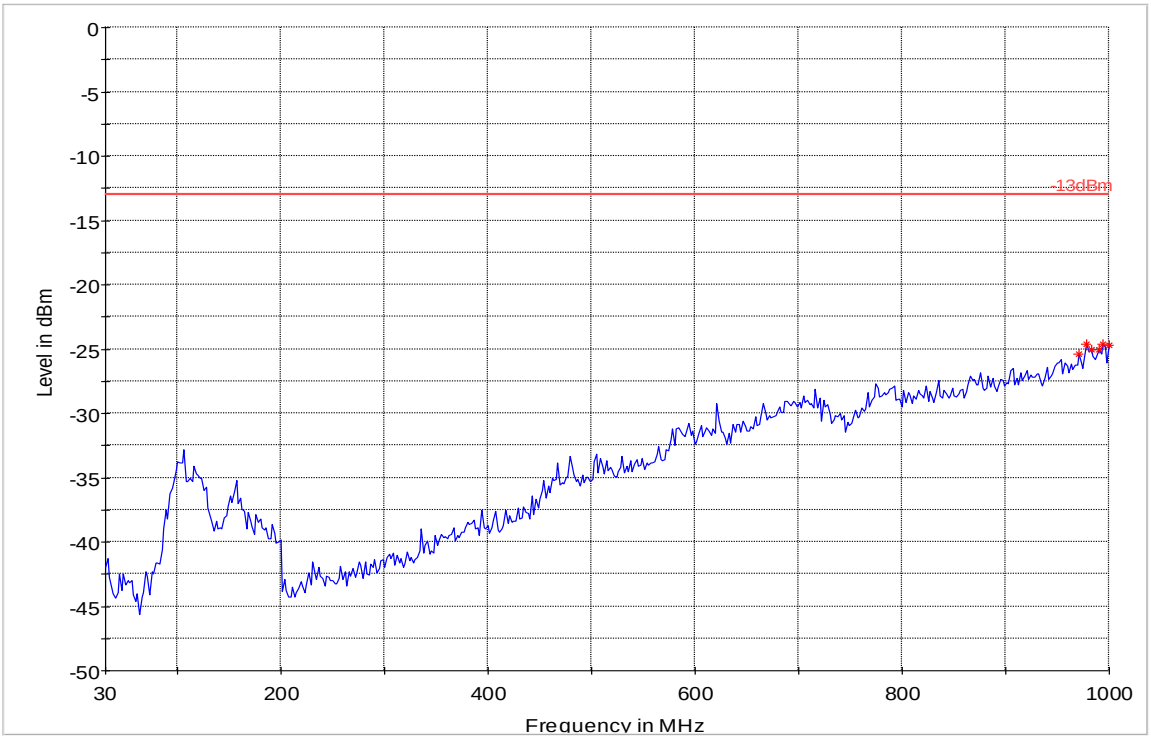


Test results 18GHz-19.1GHz



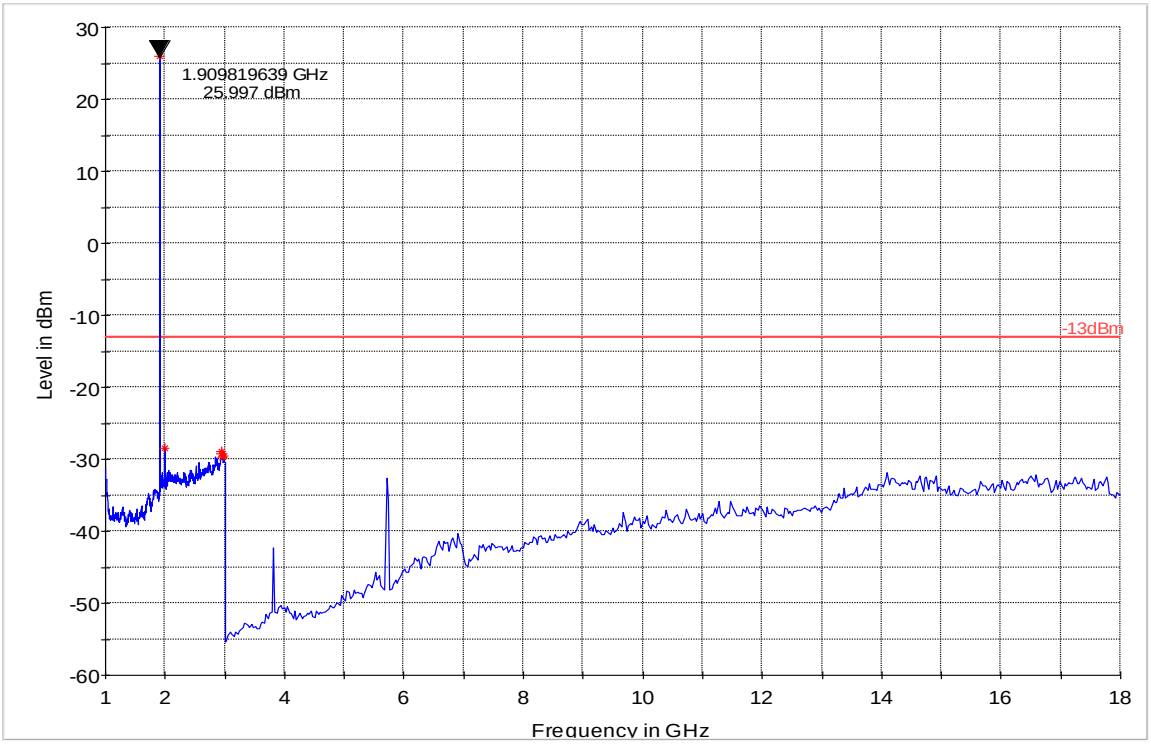
Radiated Spurious Emissions (GSM-1900) Tx: High Channel

Test results 30M-1GHz

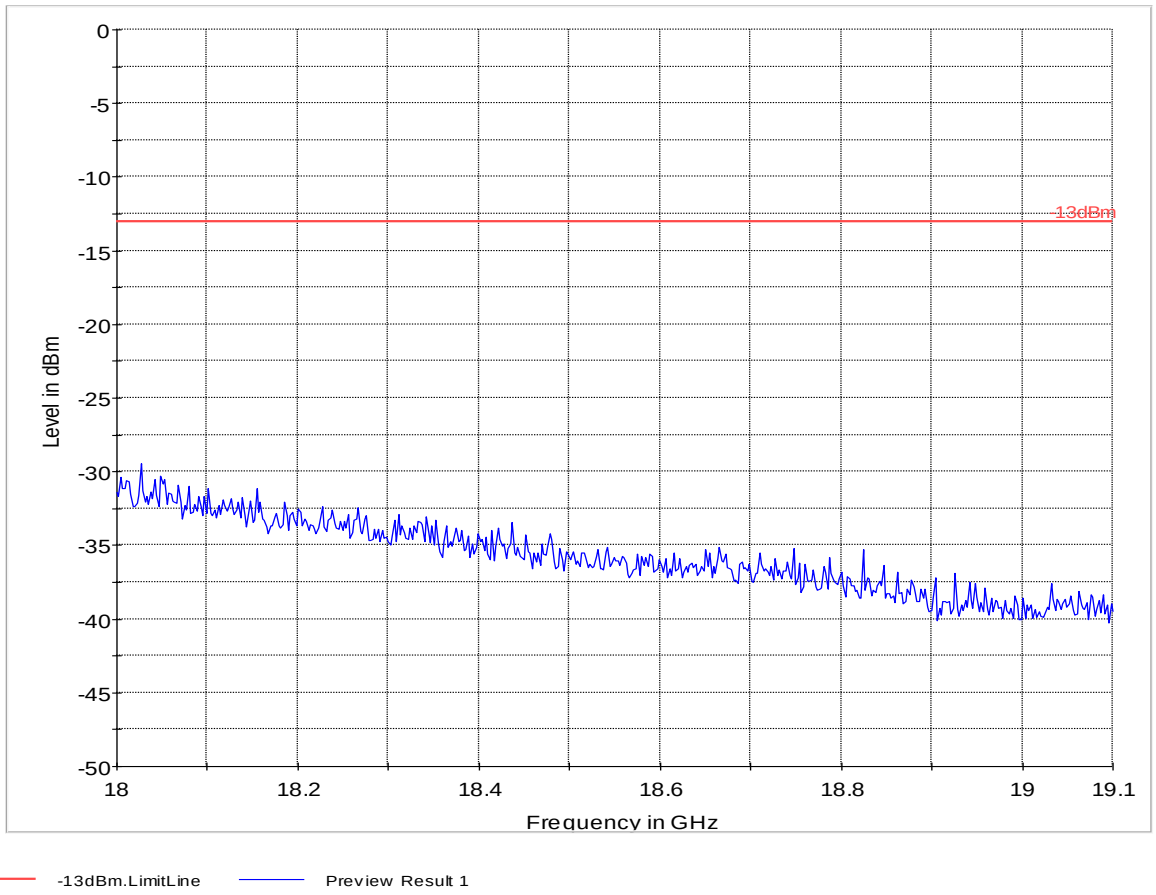


Test results 1GHz-18GHz

Spur above the limit line is the TX signal



Test results 18GHz-19.1GHz



6.3 Radiated out of band emissions results on EUT- Receive Mode:

6.3.1 References

FCC: CFR Part 15.109, 2.1053

6.3.2 Limits

6.3.2.1 §15.109 Radiated emission limits- Unintentional Radiators:

If a radiated measurement is made, all spurious emissions shall comply with the limits of table (1) as shown.

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (µV/m)
30–88	100 (40dBµV/m)
88–216	150 (43.5 dBµV/m)
216–960	200 (46 dBµV/m)
Above 960	500 (54 dBµV/m)

(b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

Frequency of emission (MHz)	Field strength (µV/m)
30–88	90
88–216	150
216–960	210
Above 960	300

6.3.3 Measurement settings:

RBW= 120kHz below 1GHz and 1MHz above 1GHz.

6.3.4 Results

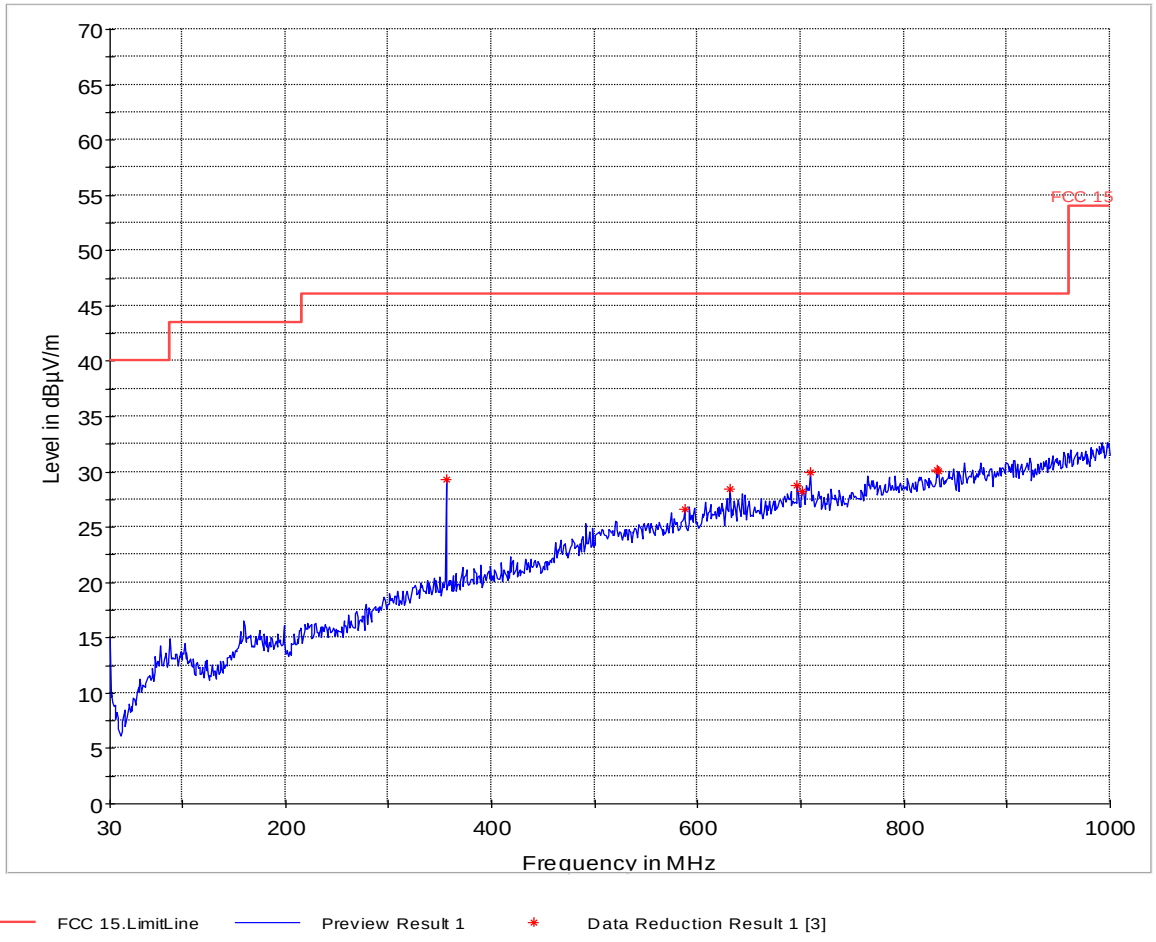
Plots reported here represent the worse case emissions for all EUT orientations and horizontal/vertical polarizations of the measurement antenna.

6.3.4.1 Measurement Result

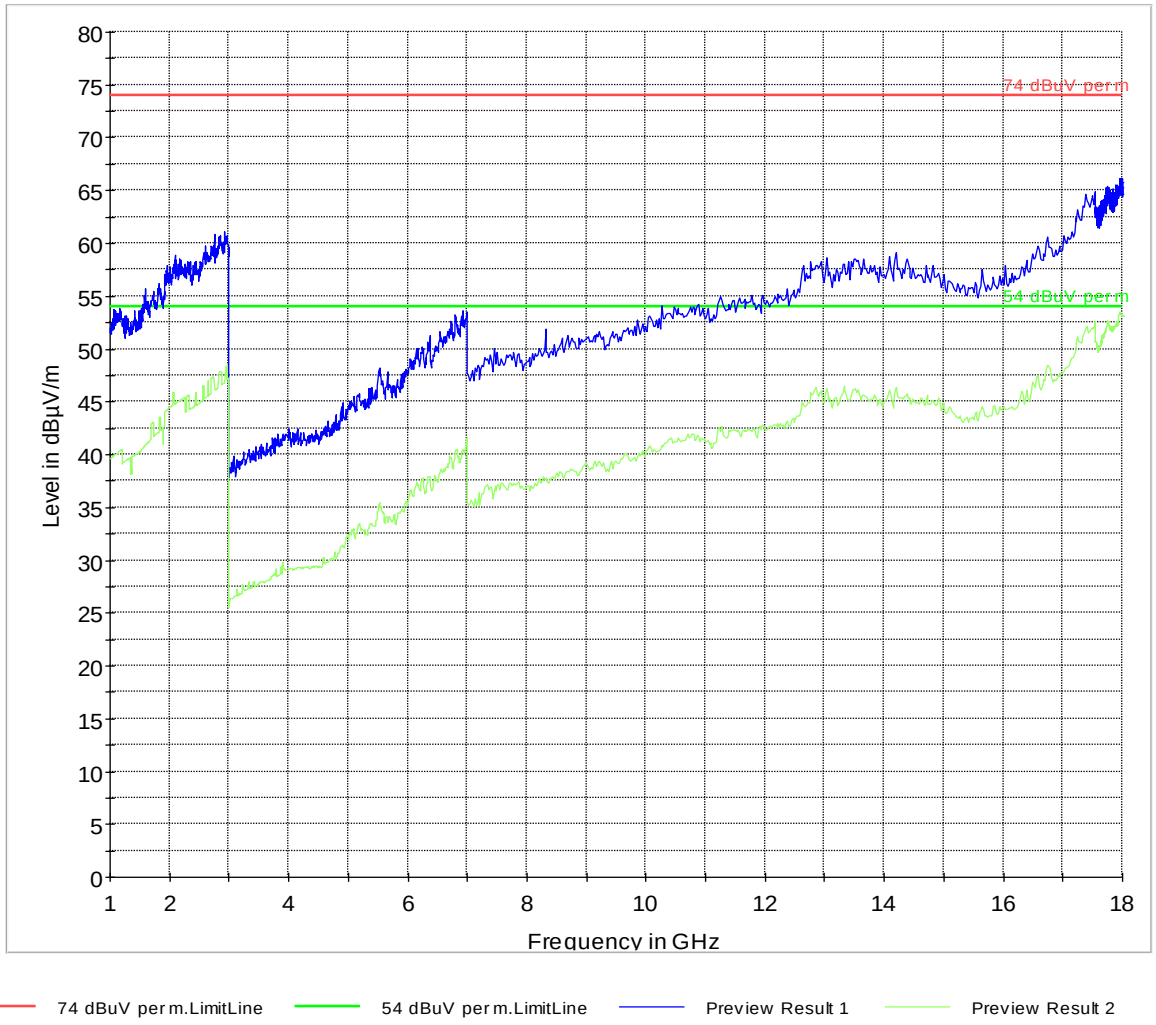
Pass.

6.3.4.2 Test Results Receiver Spurious Emission

Receive Mode: 30MHz-1GHz



Receive Mode: 1GHz-18GHz



6.4 AC Power Line Conducted Emissions

6.4.1 References:

FCC: CFR Part 15.207
The purpose of this test is to measure unwanted radio frequency currents induced in any AC conductor external to the equipment which could conduct interference to other equipment via the AC electrical network.

6.4.2 Limits:

6.4.2.1 §15.207 Conducted limits- Intentional Radiators:

(a) Except as shown in paragraphs (b) and (c) of this section of the CFR, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table (1), as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Table 1:

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 the logarithm of the frequency.

6.4.3 Measurement settings:

RBW= 9kHz

6.4.4 Results

Plots shown here represent the combined worse case emissions for Lines, Phase and Neutral.

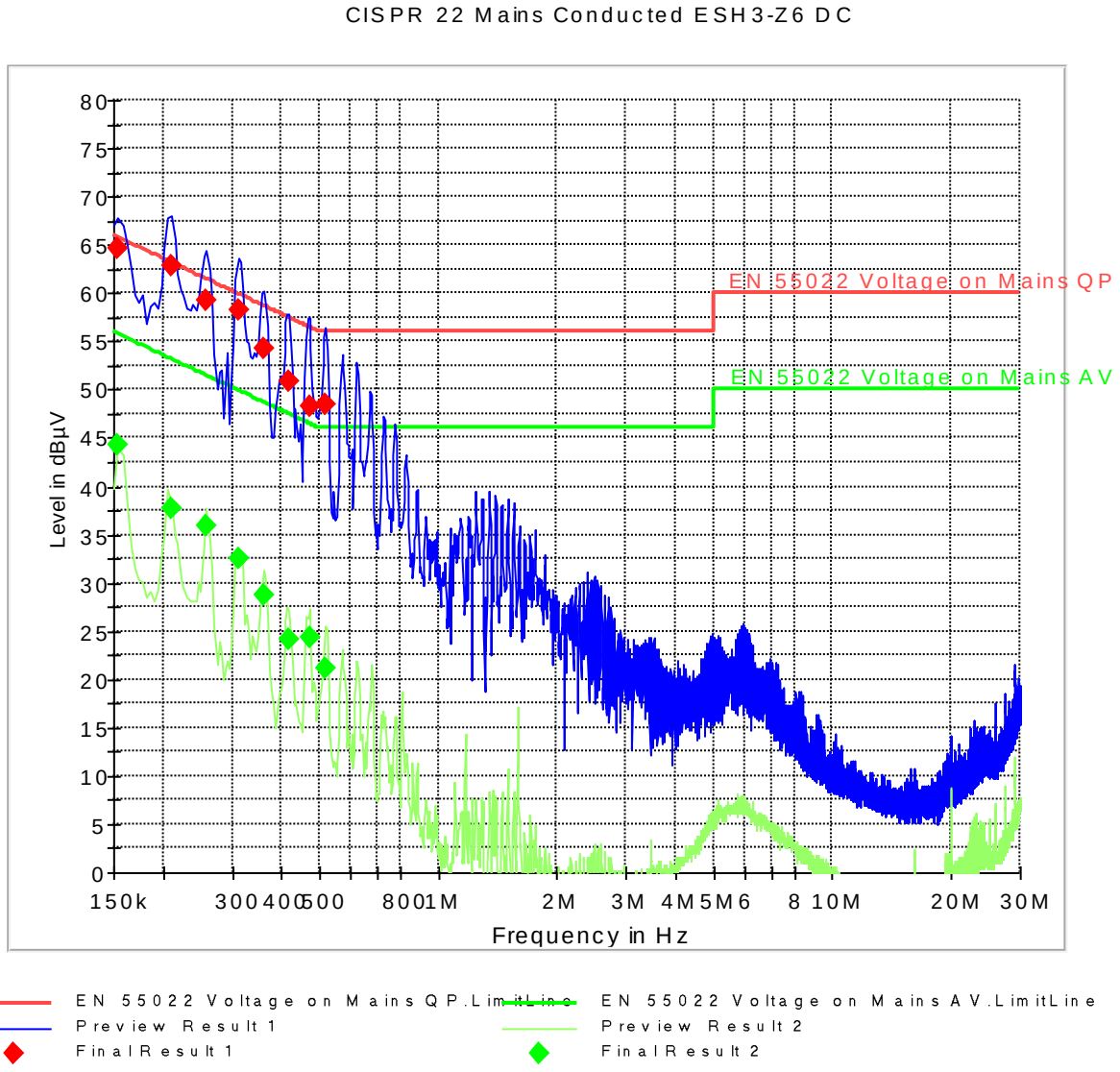
6.4.4.1 Measurement Result

Pass.

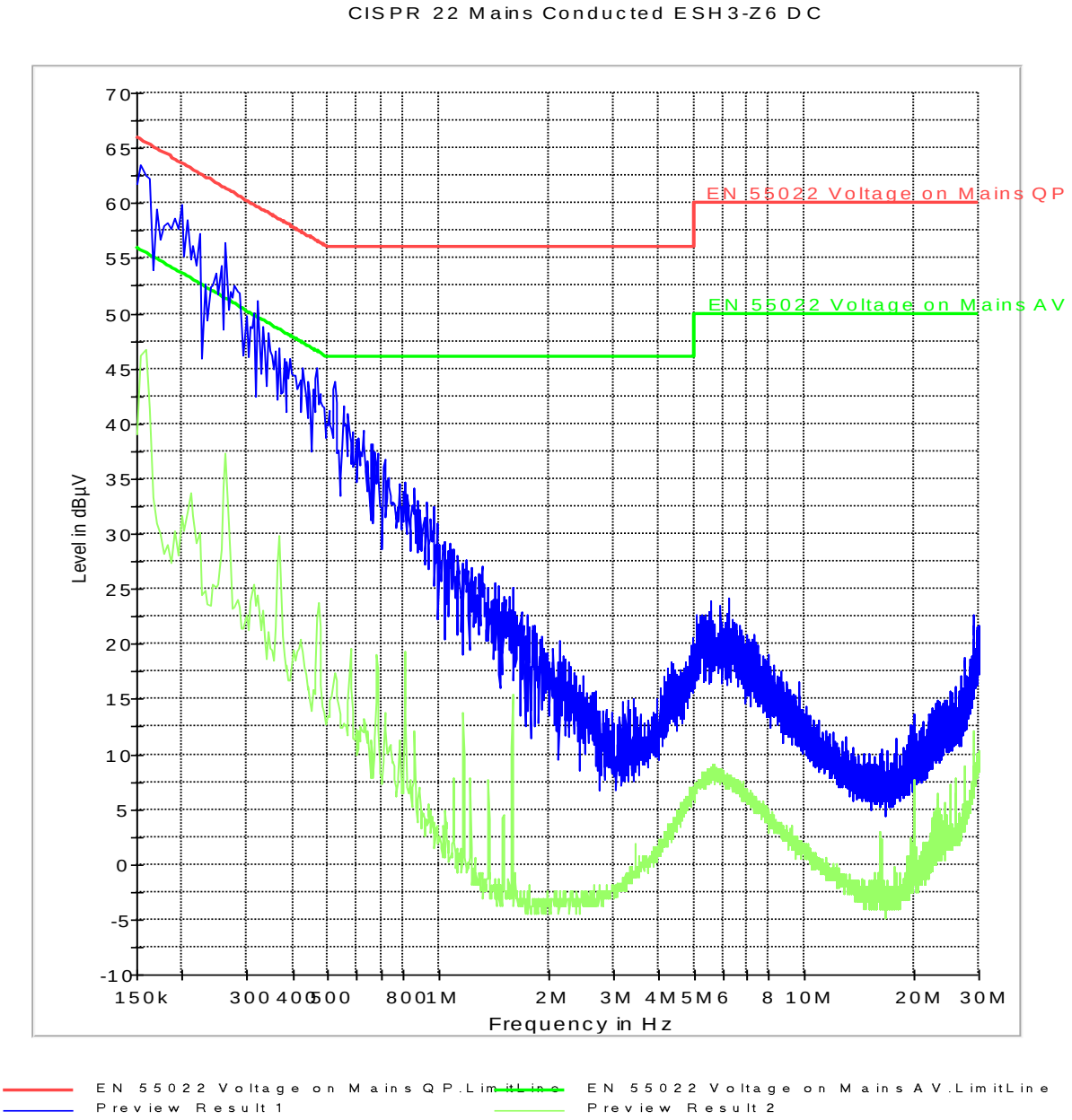
6.4.5 Test Results:

850 TX Mode:

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.154000	64.6	20.0	9.000	GN	L1	0.5	1.2	65.8	
0.210000	62.8	20.0	9.000	GN	L1	0.4	0.4	63.2	
0.258000	59.3	20.0	9.000	GN	L1	0.3	2.2	61.5	
0.310000	58.3	20.0	9.000	GN	L1	0.3	1.7	60.0	
0.362000	54.2	20.0	9.000	GN	L1	0.2	4.5	58.7	
0.418000	50.8	20.0	9.000	GN	L1	0.3	6.7	57.5	
0.470000	48.2	20.0	9.000	GN	L1	0.3	8.3	56.5	
0.518000	48.5	20.0	9.000	GN	L1	0.2	7.5	56.0	



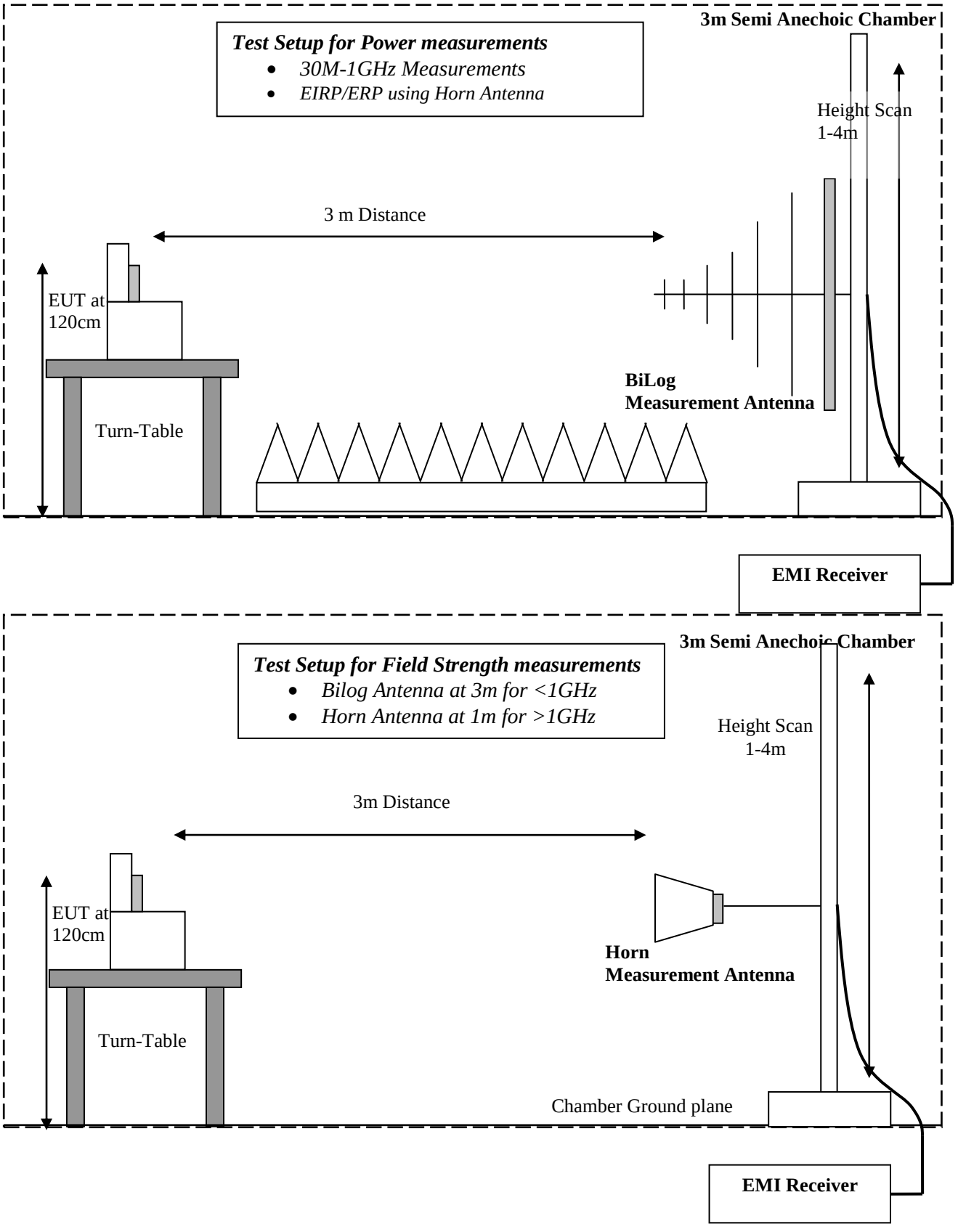
1900 TX Mode:


CISPR 22 Mains Conducted ESH3-Z6 DC
EN 55022 Voltage on Mains QP
EN 55022 Voltage on Mains AV
Level in dBµV
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
150k
300
400
500
800
1M
2M
3M
4M
5M
6
8
10M
20M
30M
Frequency in Hz
EN 55022 Voltage on Mains QP.LimitLine
EN 55022 Voltage on Mains AV.LimitLine
Preview Result 1
Preview Result 2

6.5 Test Equipment and Ancillaries used for tests

Instrument/Ancillary	Model	Manufacturer	Serial No.	Cal Date	Cal Interval
Radio Communication Tester	CMU 200	Rohde & Schwarz	101821	June 2010	1 year
Radio Communication Tester	CMU 200	Rohde & Schwarz	109879	June 2010	1 year
Bluetooth Tester	CBT	Rohde & Schwarz	100212	May 2009	2 Years
EMI Receiver/Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2010	1 year
Spectrum Analyzer	FSU	Rohde & Schwarz	200302	Jul 2010	1 year
Loop Antenna	6512	EMCO	00049838	April 2009	2 years
Biconilog Antenna	3141	EMCO	0005-1186	June 2009	2 years
Horn Antenna (1-18GHz)	3115	ETS	00035111	Jan 2009	3 years
Horn Antenna (18-40GHz)	3116	ETS	00070497	Jan 2009	3 years
Communication Antenna	IBP5-900/1940	Kathrein	n/a	n/a	n/a
High Pass Filter	5HC2700	Trilithic Inc.	9926013	Part of system calibration	
High Pass Filter	4HC1600	Trilithic Inc.	9922307	Part of system calibration	
6GHz High Pass Filter	HPM50106	Microtronics	001	Part of system calibration	
Pre-Amplifier	JS4-00102600	Miteq	00616	Part of system calibration	
LISN	R&S	ESH3-Z6	836154/011	May 2009	2 Years
Power Smart Sensor	R&S	NRP-Z81	100161	June 2010	1 Year
DC Power Supply	6632A	Hewlett Packard	3524A-12822	n/a	n/a
DC Power Supply	6655A	Hewlett Packard	3403A-00487	n/a	n/a
Multimeter	179	Fluke	N/A	Feb 2010	1 Year
Temp Hum Logger	TM320	Dickson	03280063	Feb 2010	1 Year
Temp Hum Logger	TM325	Dickson	5285354	Feb 2010	1 Year

7 Block Diagrams



8 Revision History

Date	Report Name	Changes to report	Report prepared by
2011-03-15	**EMC_GARMI_033_11001_FCC22_24**	**First Version**	**J Sabado**