

# TEST REPORT

## No. FCC-PART24-2005007

|           |                                  |
|-----------|----------------------------------|
| Test name | FCC Test                         |
| Product   | GSM Mobile Station               |
| Model     | T218                             |
| Client    | TCL Mobile Communication Co.,Ltd |

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|                                |                                                                                                                                                                                                                                         |                               |             |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------|
| <b>Product</b>                 | GSM Mobile Station                                                                                                                                                                                                                      | <b>Model</b>                  | T218        |
|                                |                                                                                                                                                                                                                                         | <b>Trade mark</b>             |             |
| <b>Client</b>                  | TCL Mobile Communication Co.,Ltd                                                                                                                                                                                                        |                               |             |
| <b>Manufacturer</b>            | TCL Mobile Communication Co.,Ltd                                                                                                                                                                                                        | <b>Arrival Date of sample</b> | Jul,31 2005 |
| <b>Place of sampling</b>       | (Blank)                                                                                                                                                                                                                                 | <b>Carrier of the samples</b> | Luo Jian    |
| <b>Quantity of the samples</b> | 6                                                                                                                                                                                                                                       | <b>Date of product</b>        | /           |
| <b>Base of the samples</b>     | (Blank)                                                                                                                                                                                                                                 | <b>Items of test</b>          | 8           |
| <b>Series number</b>           | 356835000010000                                                                                                                                                                                                                         |                               |             |
| <b>Standard(s)</b>             | FCC Part 24, FCC Part 22                                                                                                                                                                                                                |                               |             |
| <b>Conclusion</b>              | <p>Final Judgment: Pass</p> <div style="text-align: right;"> <br/>             (Stamp)<br/>             Date of issue: Aug 22, 2005         </div> |                               |             |
| <b>Comment</b>                 | The test result relates only to the tested sample.                                                                                                                                                                                      |                               |             |

Approved by   张牛   Reviewed by   张锐   Performed by   宋崇文    
 (Lu Minniu) (Zhang Rui) (Song Chongwen)

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## 1 COMPETENCE AND WARRANTIES

**Telecommunication Metrology Center of Ministry of Information Industry** is a test laboratory accredited by DAR (DATEch) – Deutschen Akkreditierungs Rat (Deutsche Akkreditierungsstelle Technik), for the tests indicated in the Certificate No. **DAT-P-114/01-10**.

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**Telecommunication Metrology Center of Ministry of Information Industry** has been accepted by the CETECOM Competent Body for the EMC test reports since April 2000.

Telecommunication Metrology Center of Ministry of Information Industry is a testing laboratory competent to carry out the tests described in this report.

**Telecommunication Metrology Center of Ministry of Information Industry** guarantees the reliability of the data presented in this report, which is the result of measurements and tests performed to the item under test on the date and under the conditions stated on the report and is based on the knowledge and technical facilities available at **Telecommunication Metrology Center of Ministry of Information Industry** at the time of execution of the test.

**Telecommunication Metrology Center of Ministry of Information Industry** is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the item under test and the results of the test.

## 2 GENERAL CONDITIONS

- 2.1 This report only refers to the item that has undergone the test.
- 2.2 This report standalone does not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities.
- 2.3 This document is only valid if complete; no partial reproduction can be made without written approval of Telecommunication Metrology Center of Ministry of Information Industry.
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## 3 ABOUT EUT

### 3.1 Addressing Information Related to EUT

**Table 1: Applicant's details (The Client)**

|                 |                                                                        |
|-----------------|------------------------------------------------------------------------|
| Name or Company | TCL Mobile Communication Co.,Ltd                                       |
| Address/Post    | No.23 Zone,Zhongkai High Technology Development Zone,Huizhou,guangdong |
| City            | Huizhou                                                                |
| Postal Code     | 516006                                                                 |
| Country         | China                                                                  |
| Telephone       | 0752- 2636729                                                          |
| Fax             | 0752- 2636525                                                          |

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**Table 2: Manufacturer's details**

|                 |                                                                        |
|-----------------|------------------------------------------------------------------------|
| Name or Company | TCL Mobile Communication Co.,Ltd                                       |
| Address/Post    | No.23 Zone,Zhongkai High Technology Development Zone,Huizhou,guangdong |
| City            | Huizhou                                                                |
| Postal Code     | 516006                                                                 |
| Country         | China                                                                  |
| Telephone       | 0752- 2636729                                                          |
| Fax             | 0752- 2636525                                                          |

### **3.2 Equipment under test (EUT)**

|                         |                                                                                                        |
|-------------------------|--------------------------------------------------------------------------------------------------------|
| Model                   | T218                                                                                                   |
| Description             | GSM mobile station                                                                                     |
| IMEI                    | EUT1: 356835000010000;                                                                                 |
| Hardware status         | V3.3                                                                                                   |
| Software status         | 01.00.03N                                                                                              |
| Frequency               | 1850.2MHz – 1909.8MHz for PCS 1900;<br>824.2MHz – 848.8MHz for GSM 850                                 |
| Type of modulation      | GMSK                                                                                                   |
| Number of channels      | 299 for PCS 1900;124 for GSM 850                                                                       |
| Antenna                 | External                                                                                               |
| Power supply            | Battery or Charger (AC Adaptor)                                                                        |
| Output power            | 29.70dBm(0.93W) maximum ERP measured for GSM 850<br>28.73dBm(0.75W) maximum EIRP measured for PCS 1900 |
| Extreme vol. Limits     | 3.4VDC to 4.2VDC (nominal: 3.7 VDC)                                                                    |
| Extreme temp. Tolerance | -30°C to +50°C                                                                                         |

### **3.3 Photographs of Equipment under test**

Photographs of MS Hand Telephone Set and Charger are respectively shown in ANNEX B of this test report.

## **4 LABORATORY ENVIRONMENT**

**Semi-anechoic chamber** (23 meters × 17meters × 10meters) did not exceed following limits along the EMC testing:

|                                   |                                                    |
|-----------------------------------|----------------------------------------------------|
| Temperature                       | Min. = 15 , Max. = 30                              |
| Relative humidity                 | Min. = 30 %, Max. = 60 %                           |
| Shielding effectiveness           | > 110 dB                                           |
| Electrical insulation             | > 10 k $\Omega$                                    |
| Ground system resistance          | < 0.5 $\Omega$                                     |
| Normalised site attenuation (NSA) | < $\pm$ 3.2 dB, 10 m distance, from 30 to 1000 MHz |
| Uniformity of field strength      | Between 0 and 6 dB, from 26 to 1000 MHz            |

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**Control room** did not exceed following limits along the EMC testing:

|                          |                         |
|--------------------------|-------------------------|
| Temperature              | Min. = 15 , Max. = 35   |
| Relative humidity        | Min. =30 %, Max. = 60 % |
| Shielding effectiveness  | > 110 dB                |
| Electrical insulation    | > 10 kΩ                 |
| Ground system resistance | < 0.5 Ω                 |

**Conducted chamber** did not exceed following limits along the EMC testing:

|                          |                          |
|--------------------------|--------------------------|
| Temperature              | Min. = 15 , Max. = 30    |
| Relative humidity        | Min. = 30 %, Max. = 60 % |
| Shielding effectiveness  | > 110 dB                 |
| Electrical insulation    | > 10 kΩ                  |
| Ground system resistance | < 0.5 Ω                  |

**Fully-anechoic chamber** (6.8 meters × 3.08 meters × 3.53 meters) did not exceed following limits along the EMC testing:

|                              |                                         |
|------------------------------|-----------------------------------------|
| Temperature                  | Min. = 15 , Max. = 30                   |
| Relative humidity            | Min. = 30 %, Max. = 60 %                |
| Shielding effectiveness      | > 110 dB                                |
| Electrical insulation        | > 10 kΩ                                 |
| Ground system resistance     | < 0.5 Ω                                 |
| Uniformity of field strength | Between 0 and 6 dB, from 26 to 1000 MHz |

## 5 SUMMARY OF TEST RESULTS

| Abbreviations used in this clause: |                |
|------------------------------------|----------------|
| P                                  | Pass           |
| NA                                 | Not applicable |
| F                                  | Fail           |

| Clause | List                         | Clause in FCC rules  | Verdict |
|--------|------------------------------|----------------------|---------|
| 1      | POWER OUTPUT                 | 22.913(a)/24.232(b)  | P       |
| 2      | FREQUENCY STABILITY          | 2.1055/24.235        | P       |
| 3      | OCCUPIED BANDWIDTH           | 2.1049(h)(i)         | P       |
| 4      | EMISSION BANDWIDTH           | 22.917(b)/24.238(b)  | P       |
| 5      | EMISSION LIMIT               | 2.1051/22.917/24.238 | P       |
| 6      | BAND EDGE COMPLIANCE         | 22.917(b)/24.238(b)  | P       |
| 7      | CONDUCTED SPURIOUS EMISSIONS | 2.1057/22.917/24.238 | P       |
| 8      | CONDUCTED EMISSIONS          | 15.107/207           | P       |

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## 6 MAIN TEST INSTRUMENTS

| NO. | NAME                                 | TYPE    | SERIES NUMBER | PRODUCER |
|-----|--------------------------------------|---------|---------------|----------|
| 1   | Test Receiver                        | ESS     | 847151/015    | R&S      |
| 2   | Test Receiver                        | ESI40   | 831564/002    | R&S      |
| 3   | BiLog Antenna                        | 3142B   | 9908-1403     | EMCO     |
| 4   | BiLog Antenna                        | 3142B   | 9908-1405     | EMCO     |
| 5   | Signal Generator                     | SMT06   | 831285/005    | R&S      |
| 6   | Signal Generator                     | SMP04   | 100070        | R&S      |
| 7   | LISN                                 | ESH2-Z5 | 829991/012    | R&S      |
| 8   | Spectrum Analyzer                    | E4440A  | MY41000262    | Agilent  |
| 9   | Universal Radio Communication Tester | CMU200  | 100680        | R&S      |
| 10  | Dual-Ridge Waveguide Horn Antenna    | 3115    | 9906-5827     | EMCO     |
| 11  | Dual-Ridge Waveguide Horn Antenna    | 3116    | 2663          | EMCO     |
| 12  | Dual-Ridge Waveguide Horn Antenna    | 3116    | 2661          | EMCO     |
| 13  | Climatic chamber                     | PL-2G   | 343074        | ESPEC    |

## 7 TEST PERIOD

The performed test started on Aug, 3, 2005 and finished on Aug, 19, 2005.

## 8 TEST LOCATION

Safety & EMC laboratory of Telecommunication Metrology Center of Ministry of Information Industry.

**ANNEX A MEASUREMENT RESULTS**

**A.1 OUTPUT POWER (§22.913(a)/ §24.232(b))**

**A.1.1 Summary**

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

This result contains peak output power and EIRP measurements for the EUT.

In all cases, output power is within the specified limits.

**A.1.2 Conducted**

**A.1.2.1 Method of Measurements**

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

The power was measured with Agilent Spectrum Analyzer E4440A (peak)

These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0 MHz and 1909.8 MHz for PCS1900 band, 824.4MHz, 836.6MHz and 848.8MHz for GSM850 band(bottom, middle and top of operational frequency range).

**GSM850**

**Limit**

| Power step | Nominal Peak output power (dBm) | Tolerance (dB) |
|------------|---------------------------------|----------------|
| 5          | 33dBm(2W)*                      | ± 2            |

\*GSM Specification – ETSI EN 300 910 V8.5.1 (2000-11) Section 4.1

**Measurement result**

EUT1: 356835000010000;

| Frequency(MHz) | Power Step | Peak output power(dBm) |
|----------------|------------|------------------------|
| 824.2          | 5          | 32.96                  |
| 836.6          | 5          | 32.98                  |
| 848.8          | 5          | 32.87                  |

**PCS1900**

**Limit**

| Power step | Nominal Peak output power (dBm) | Tolerance (dB) |
|------------|---------------------------------|----------------|
| 0          | 30dBm(1W)*                      | ± 2            |

\*GSM Specification – ETSI EN 300 910 V8.5.1 (2000-11) Section 4.1

**Measurement result**

EUT1: 356835000010000;

| Frequency(MHz) | Power Step | Peak output power(dBm) |
|----------------|------------|------------------------|
| 1850.2         | 0          | 30.09                  |
| 1880.0         | 0          | 29.35                  |
| 1909.8         | 0          | 29.29                  |

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**A.1.3 Radiated**

**A.1.3.1 Description**

This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

Rule Part 22.913(a) specifies "Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

**A.1.3.2 Method of Measurement**

1. In an anechoic antenna test chamber, a half-wave dipole antenna for the frequency band of interest is placed at the reference centre of the chamber. An RF Signal source for the frequency band of interest is connected to the dipole with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A known (measured) power ( $P_{in}$ ) is applied to the input of the dipole, and the power received ( $P_r$ ) at the chamber's probe antenna is recorded.
2. A "reference path loss" is established as  $P_{in} + 2.15 - P_r$ .
3. The EUT is substituted for the dipole at the reference centre of the chamber and a scan is performed to obtain the radiation pattern.
4. From the radiation pattern, the co-ordinates where the maximum antenna gain occurs are identified.
5. The EUT is then put into pulse mode at its maximum power level (Power Step 0 for PCS1900, 5 for GSM 850).
6. "Gated mode" power measurements are performed with the receiving antenna placed at the coordinates determined in Step 3 to determine the output power as defined in Rule 24.232 (b) and (c). The "reference path loss" from Step1 is added to this result.
7. This value is EIRP since the measurement is calibrated using a half-wave dipole antenna of known gain (2.15 dBi) and known input power ( $P_{in}$ ).
8. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dBi}$ .

**GSM 850-ERP 22.913(a)**

**Limits**

| Power Step | Burst Peak ERP (dBm)        |
|------------|-----------------------------|
| 5          | $\leq 38.45\text{dBm}$ (7W) |

**Measurement result**

| Frequency(MHz) | Power Step | Peak ERP(dBm) |
|----------------|------------|---------------|
| 824.2          | 5          | 29.70         |
| 836.6          | 5          | 29.68         |
| 848.8          | 5          | 29.48         |

**ANALYZER SETTINGS: RBW = VBW = 3MHz**

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**PCS1900-EIRP 24.232(b)**

**Limits**

| Power Step | Burst Peak EIRP (dBm) |
|------------|-----------------------|
| 0          | ≤33dBm (2W)           |

**Measurement result**

| Frequency(MHz) | Power Step | Peak EIRP(dBm) |
|----------------|------------|----------------|
| 1850.2         | 0          | 28.73          |
| 1880.0         | 0          | 26.98          |
| 1909.8         | 0          | 25.19          |

**ANALYZER SETTINGS: RBW = VBW = 3MHz**

**A.2 FREQUENCY STABILITY (§2.1055/§24.235)**

**A.2.1 Method of Measurement**

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30 °C.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 661 for PCS 1900 and channel 190 for GSM850, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10 °C increments from -30 °C to +50 °C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50 °C.
7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on channel 661 (centre channel), measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from +50 °C to -30 °C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5 °C during the measurement procedure.

**A.2.2 Measurement Limit**

**A.2.2.1 For Hand carried battery powered equipment**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental

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emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.4VDC and 4.2VDC, with a nominal voltage of 3.7VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance of -8.1 % and +13.5 %. For the purposes of measuring frequency stability these voltage limits are to be used.

**A.2.2.1 For equipment powered by primary supply voltage**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

**A.2.3 Measurement results**

**GSM 850**

**Frequency Error vs Voltage**

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|------------|---------------------|----------------------|
| 3.4        | 9                   | 0.011                |
| 3.7        | 7                   | 0.008                |
| 4.2        | 9                   | 0.011                |

**Frequency Error vs Temperature**

| temperature( ) | Frequency error(Hz) | Frequency error(ppm) |
|----------------|---------------------|----------------------|
| -30            | 19                  | 0.023                |
| -20            | 19                  | 0.023                |
| -10            | 17                  | 0.020                |
| 0              | 19                  | 0.023                |
| 10             | 14                  | 0.017                |
| 20             | 15                  | 0.018                |
| 30             | 11                  | 0.013                |
| 40             | 12                  | 0.014                |
| 50             | 16                  | 0.019                |

**PCS 1900**

**Frequency Error vs Voltage**

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|------------|---------------------|----------------------|
| 3.4        | 21                  | 0.011                |
| 3.7        | 16                  | 0.009                |
| 4.2        | 14                  | 0.007                |

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**Frequency Error vs Temperature**

| temperature( ) | Frequency error(Hz) | Frequency error(ppm) |
|----------------|---------------------|----------------------|
| -30            | 26                  | 0.014                |
| -20            | 23                  | 0.012                |
| -10            | 24                  | 0.013                |
| 0              | 22                  | 0.012                |
| 10             | 18                  | 0.010                |
| 20             | 19                  | 0.010                |
| 30             | 19                  | 0.010                |
| 40             | 21                  | 0.011                |
| 50             | 19                  | 0.010                |

**A.3 OCCUPIED BANDWIDTH (§2.1049(h)(i))**

**A.3.1 Occupied Bandwidth Results**

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the USPCS frequency band. The table below lists the measured -20dBc BW (99%). Spectrum analyzer plots are included on the following pages.

**GSM 850(-20dBc)**

EUT1: 356835000010000

| Frequency(MHz) | Occupied Bandwidth (-20dBc BW)( kHz) |
|----------------|--------------------------------------|
| 824.2          | 267.979                              |
| 836.6          | 280.310                              |
| 848.8          | 264.872                              |

**ANALYZER SETTINGS: RBW=VBW=3kHz**

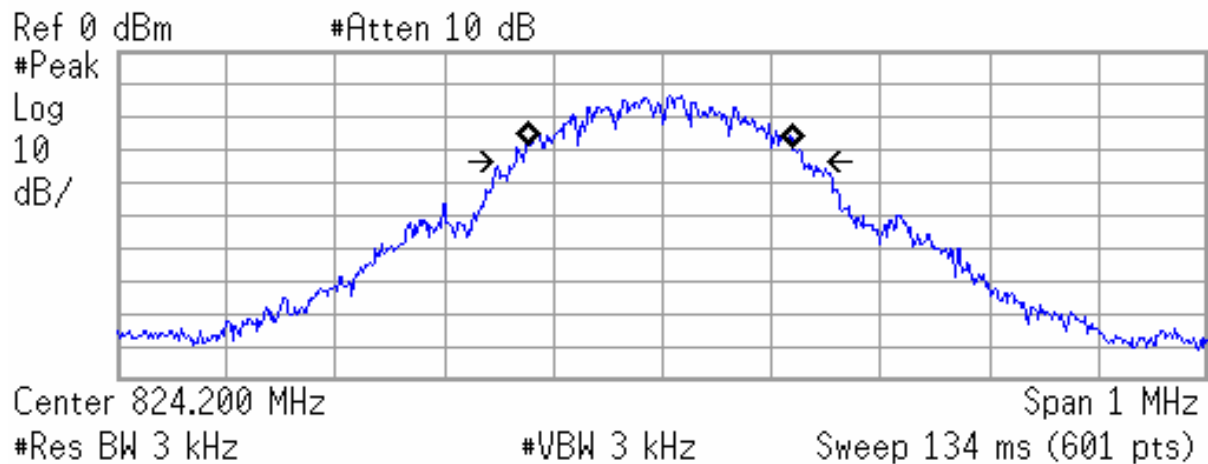
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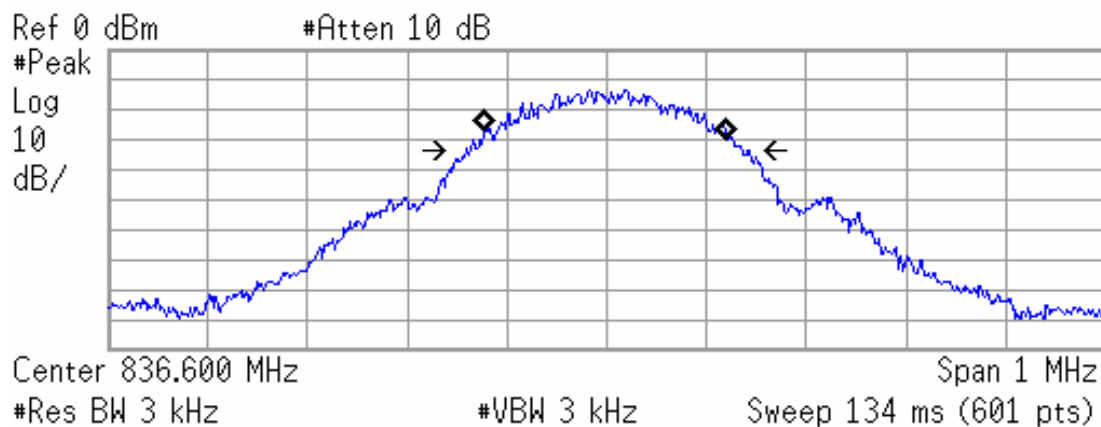
GSM 850

Channel 128-Occupied Bandwidth (-20dBc BW)



|                     |              |           |
|---------------------|--------------|-----------|
| Occupied Bandwidth  | Occ BW % Pwr | 99.00 %   |
| 246.2545 kHz        | x dB         | -20.00 dB |
| Transmit Freq Error | -1.944 kHz   |           |
| x dB Bandwidth      | 267.979 kHz  |           |

Channel 190-Occupied Bandwidth (-20dBc BW)



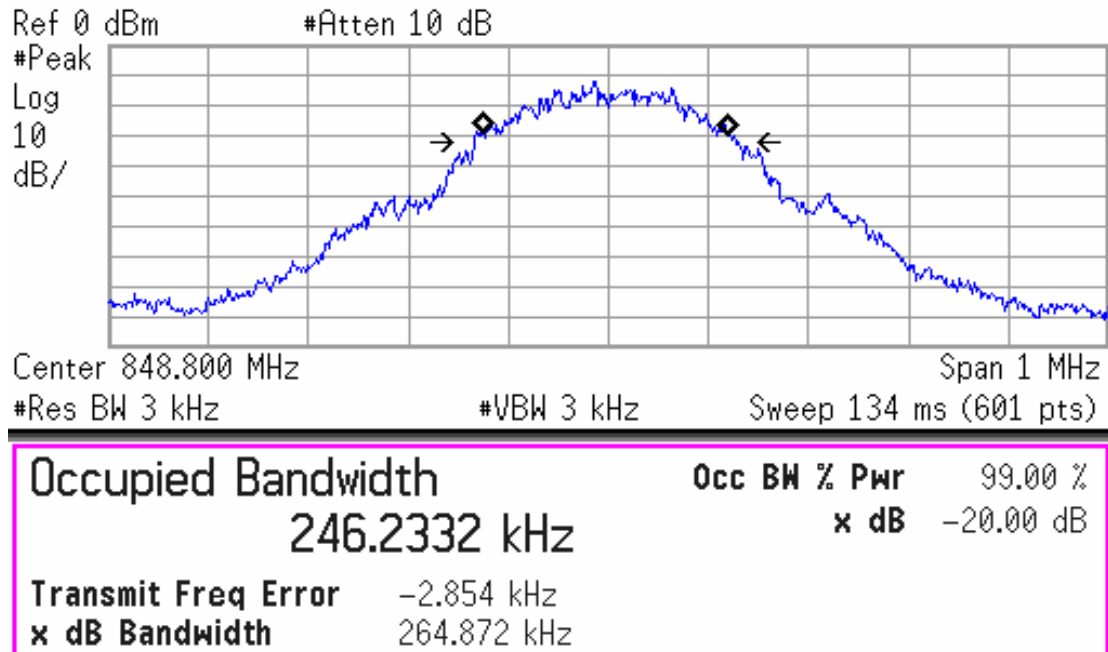
|                     |              |           |
|---------------------|--------------|-----------|
| Occupied Bandwidth  | Occ BW % Pwr | 99.00 %   |
| 246.2703 kHz        | x dB         | -20.00 dB |
| Transmit Freq Error | -1.211 kHz   |           |
| x dB Bandwidth      | 280.310 kHz  |           |

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**Channel 251-Occupied Bandwidth (-20dBc BW)**



**PCS 1900(-20dBc)**

EUT1: 356835000010000

| Frequency(MHz) | Occupied Bandwidth (-20dBc BW)( kHz) |
|----------------|--------------------------------------|
| 1850.2         | 275.289                              |
| 1880.0         | 271.310                              |
| 1909.8         | 273.561                              |

**ANALYZER SETTINGS: RBW=VBW=3kHz**

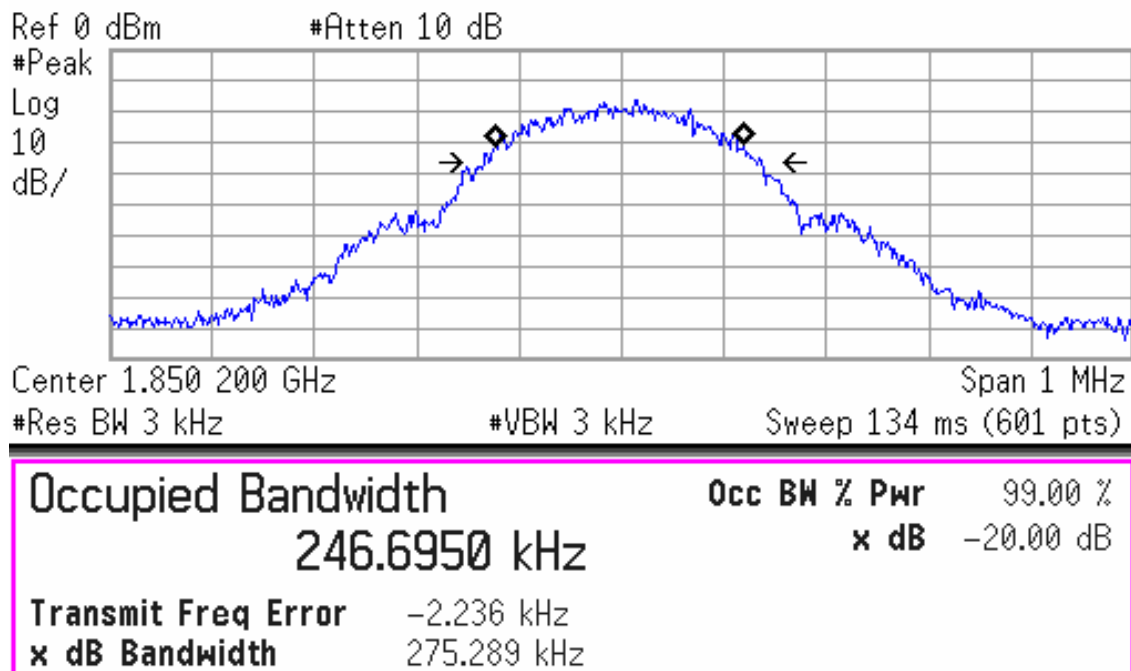
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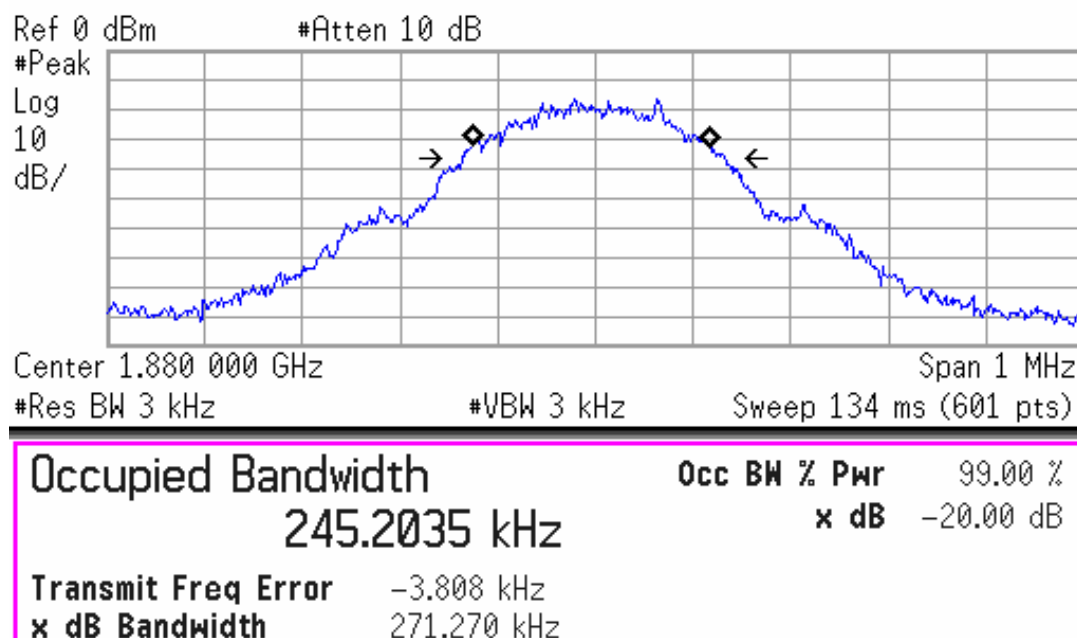
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PCS 1900

Channel 512-Occupied Bandwidth (-20dBc BW)



Channel 661-Occupied Bandwidth (-20dBc BW)

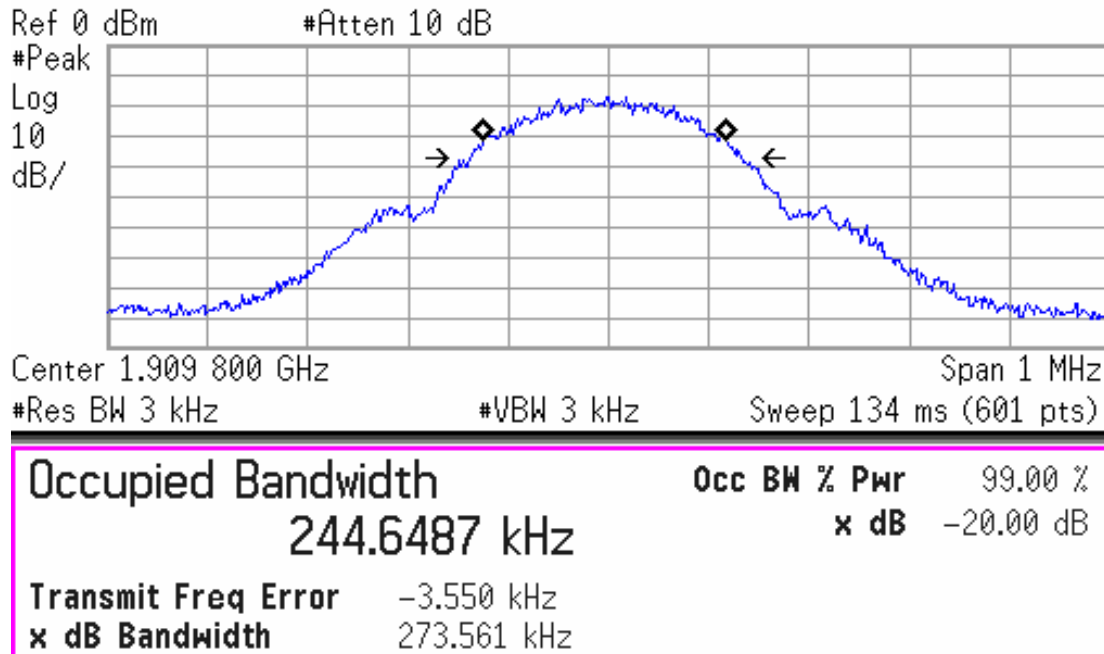


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**Channel 810-Occupied Bandwidth (-20dBc BW)**



**A.4 EMISSION BANDWIDTH (§22.917(b)/§24.238(b))**

**A.4.1 Emission Bandwidth Results**

Similar to conducted emissions; Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the PCS1900 band and GSM850 band Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

**GSM 850(-26dBc)**

EUT1: 356835000010000

| Frequency(MHz) | Occupied Bandwidth (-26dBc BW)( kHz) |
|----------------|--------------------------------------|
| 824.2          | 313.886                              |
| 836.6          | 315.192                              |
| 848.8          | 314.660                              |

**ANALYZER SETTINGS: RBW=VBW=3kHz**

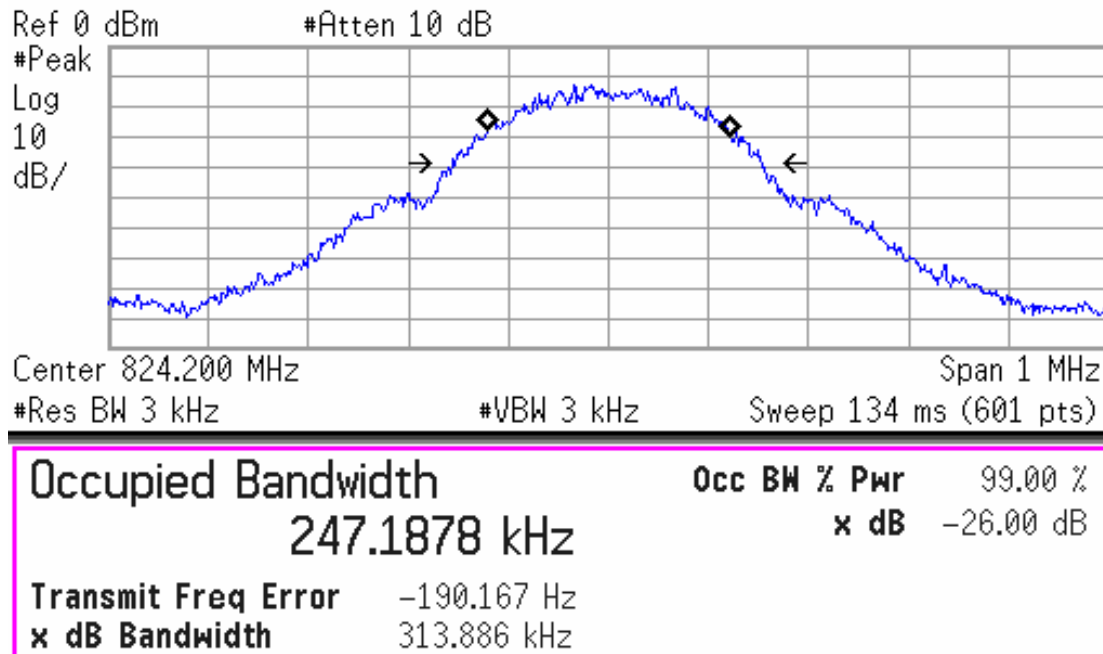
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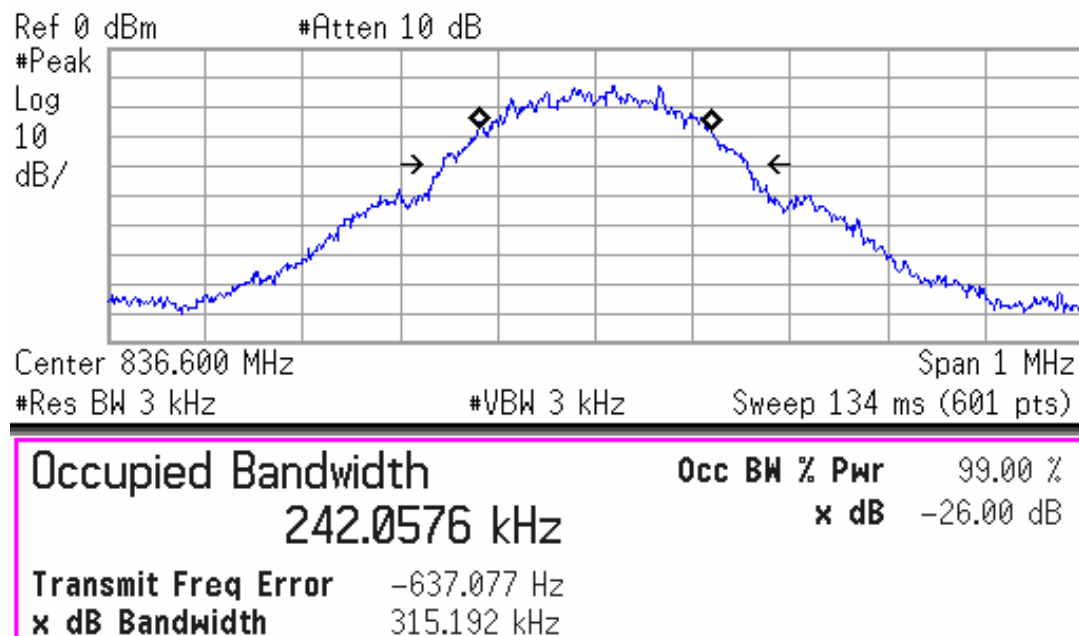
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GSM 850

Channel 128-Occupied Bandwidth (-26dBc BW)



Channel 190-Occupied Bandwidth (-26dBc BW)

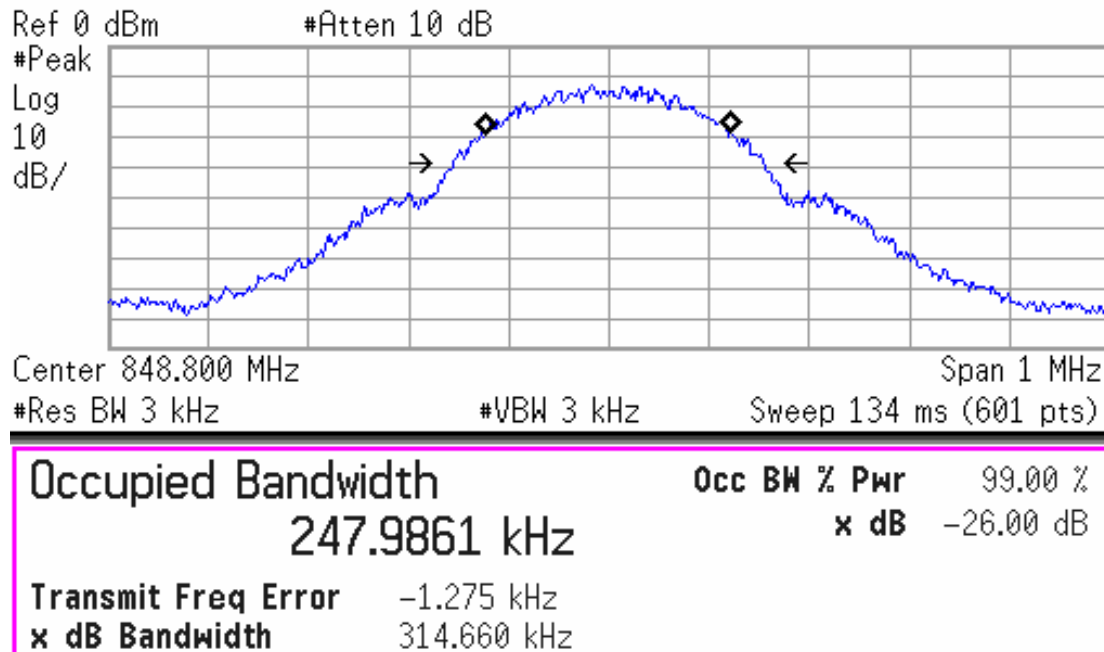


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**Channel 251-Occupied Bandwidth (-26dBc BW)**



**PCS 1900(-26dBc)**

EUT1: 356835000010000

| Frequency(MHz) | Occupied Bandwidth (-26dBc BW)( kHz) |
|----------------|--------------------------------------|
| 1850.2         | 315.540                              |
| 1880.0         | 312.143                              |
| 1909.8         | 308.288                              |

**ANALYZER SETTINGS: RBW=VBW=3kHz;**

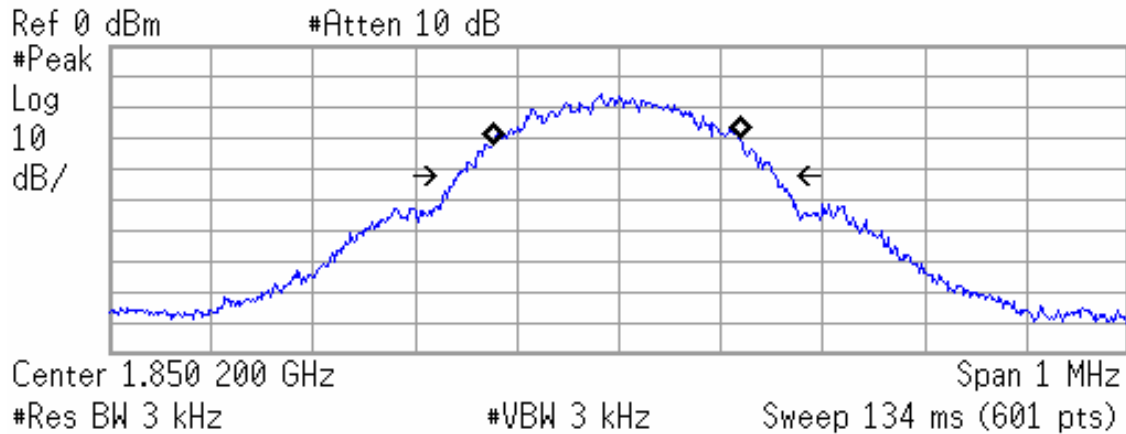
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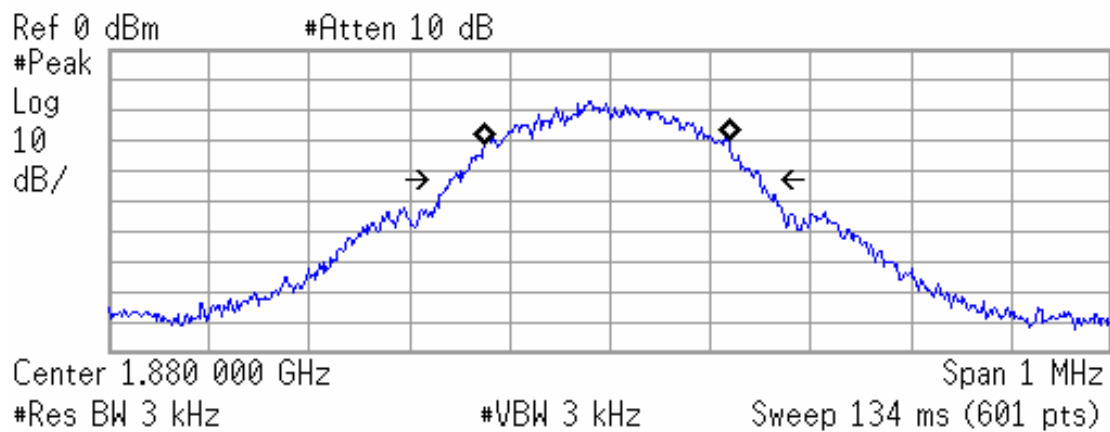
PCS 1900

Channel 512-Occupied Bandwidth (-26dBc BW)



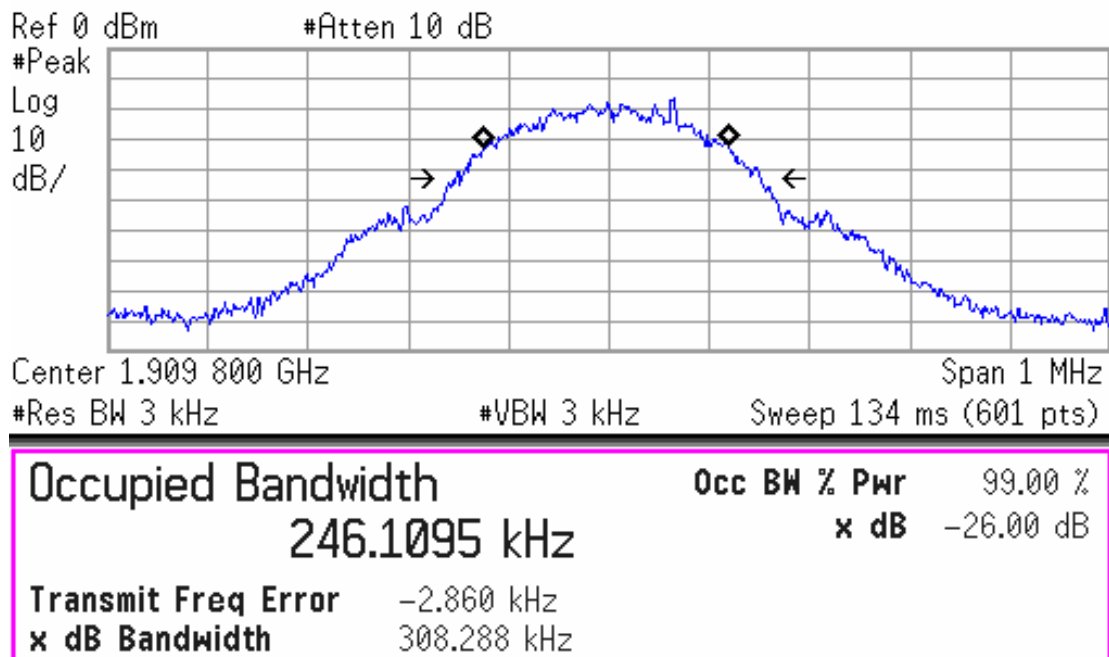
|                     |              |           |
|---------------------|--------------|-----------|
| Occupied Bandwidth  | Occ BW % Pwr | 99.00 %   |
| 246.4497 kHz        | x dB         | -26.00 dB |
| Transmit Freq Error | -2.471 kHz   |           |
| x dB Bandwidth      | 315.540 kHz  |           |

Channel 661-Occupied Bandwidth (-26dBc BW)



|                     |              |           |
|---------------------|--------------|-----------|
| Occupied Bandwidth  | Occ BW % Pwr | 99.00 %   |
| 246.0758 kHz        | x dB         | -26.00 dB |
| Transmit Freq Error | -3.700 kHz   |           |
| x dB Bandwidth      | 312.143 kHz  |           |

**Channel 810-Occupied Bandwidth (-26dBc BW)**



**A.5 EMISSION LIMIT (§2.1051/§24.238)**

**A.5.1 Measurement Method**

The site is constructed in accordance with ANSI C63.4 – 1992 requirements and is recognized by the FCC. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set 1MHz as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the PCS1900 and GSM850 band.

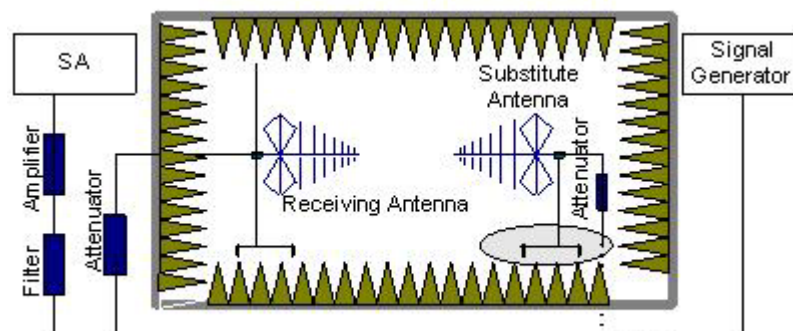
**The procedure of radiated spurious emissions is as follows:**

a) Pre-calibration

With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as,

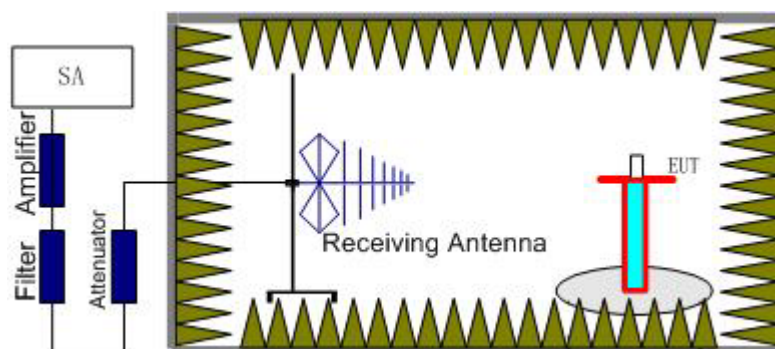
$$RSE = Rx \text{ (dBuV)} + CL \text{ (dB)} + SA \text{ (dB)} + Gain \text{ (dBi)} - 107 \text{ (dBuV to dBm)}$$

The SA is calibrated using following setup.



**b) EUT test**

EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



**A.5.2 Measurement Limit**

Sec. 24.238 Emission Limits.

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

**A.5.3 Measurement Results**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS band (1850.2 MHz, 1880 MHz and 1909.8 MHz) and GSM850 band (824.2MHz, 836.6MHz, 848.8MHz). 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 PCS1900 and GSM850 band into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**NOTE: The spurious emissions were done with different settings, using the**

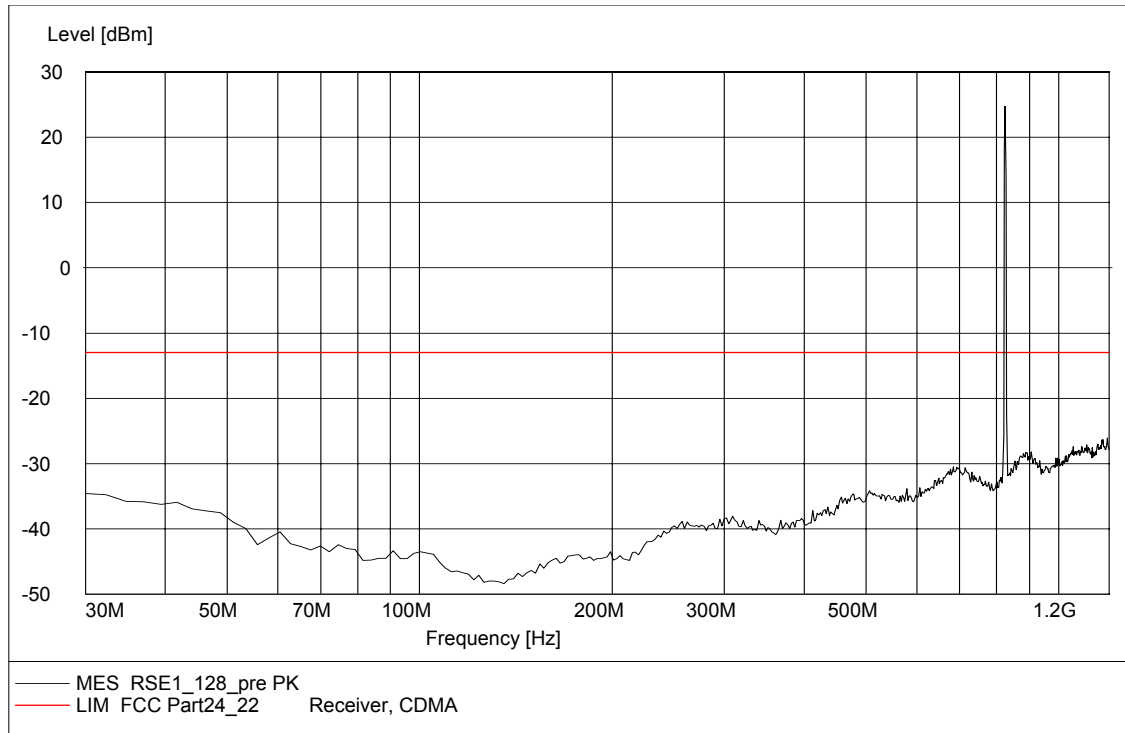
relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels.

#### GSM 850

##### A.5.3.1 RADIATED SPURIOUS EMISSIONS-Channel 128: 30MHz –1.2GHz

Radiated spurious emission limit :-13dBm.

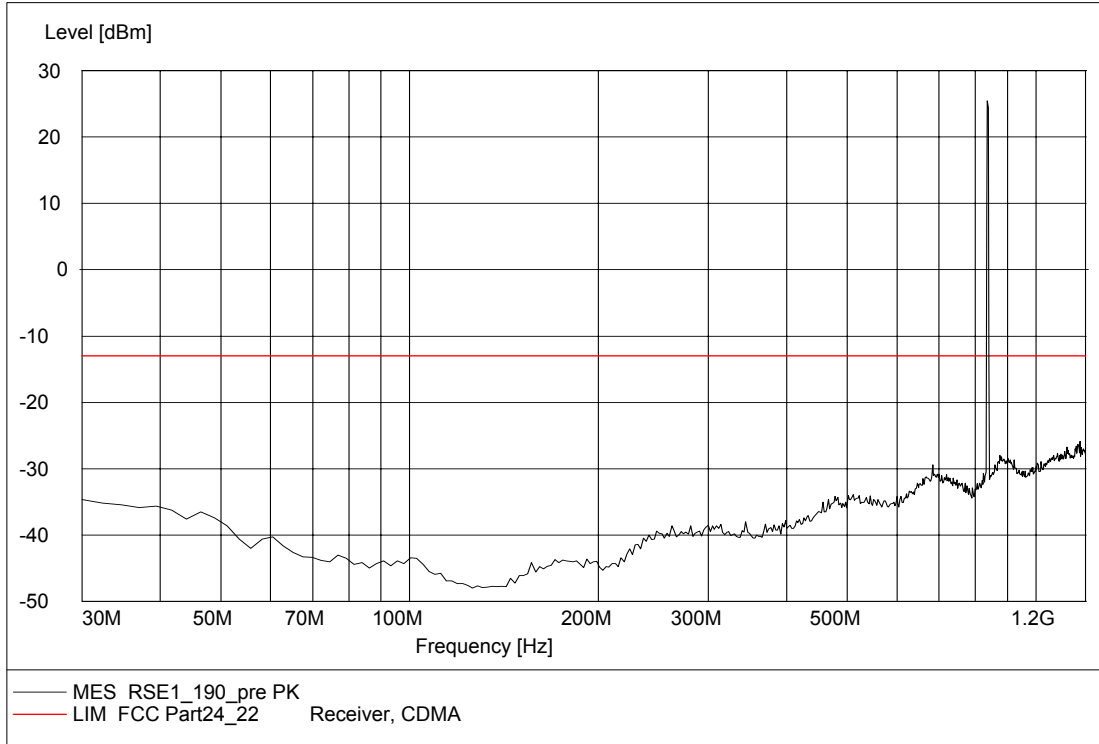
NOTE: peak above the limit line is the Carrier frequency @ ch-128



**A.5.3.2 RADIATED SPURIOUS EMISSIONS-Channel 190: 30MHz – 1.2GHz**

**Radiated spurious emission limit :-13dBm.**

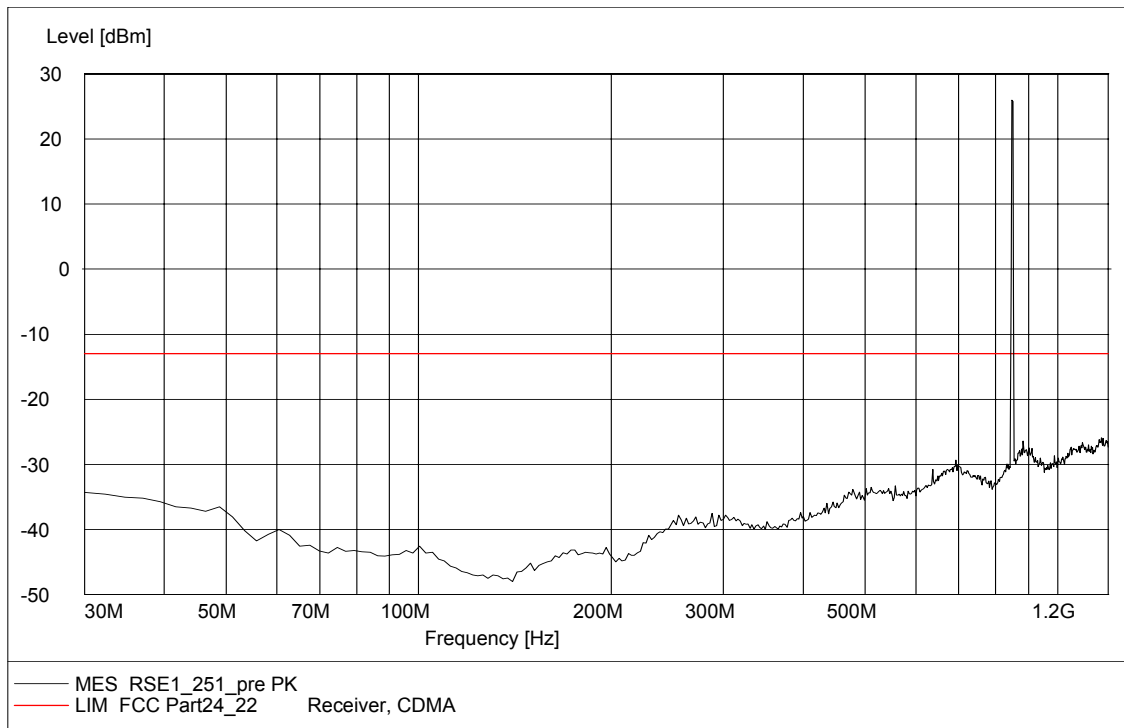
**NOTE: peak above the limit line is the Carrier frequency @ ch-190**



**A.5.3.3 RADIATED SPURIOUS EMISSIONS-Channel 251: 30MHz – 1.2GHz**

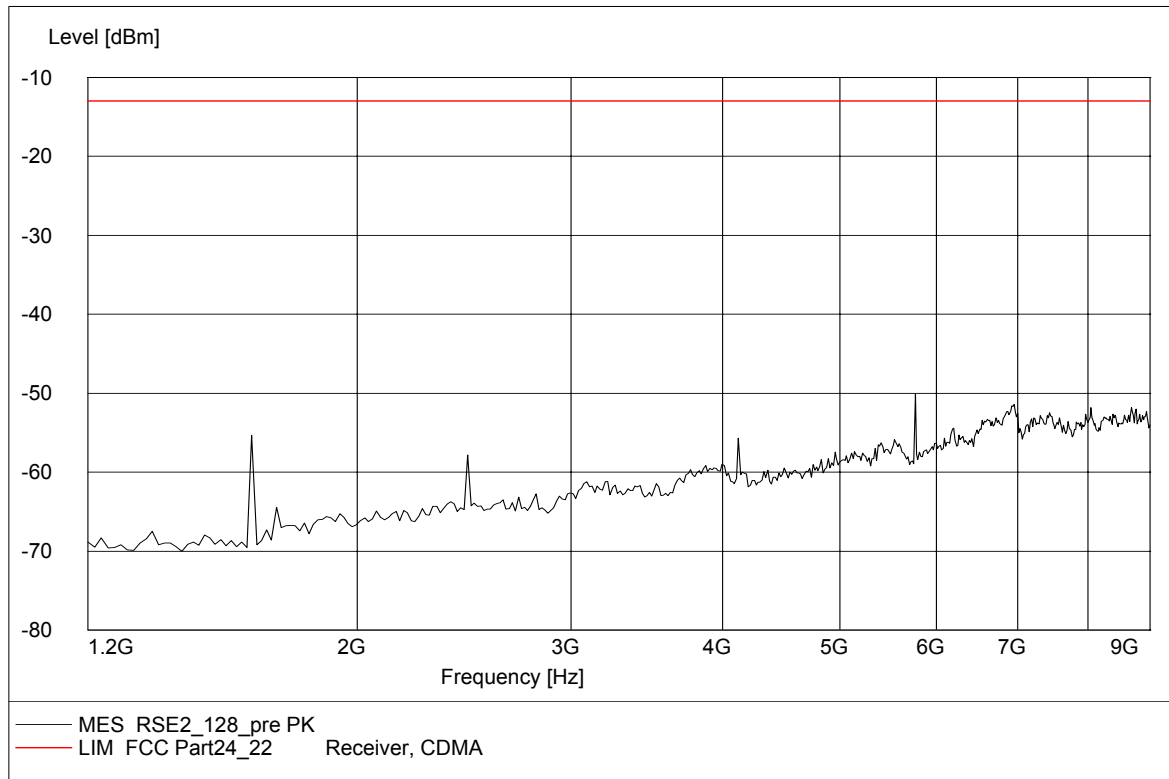
**Radiated spurious emission limit :-13dBm.**

**NOTE: peak above the limit line is the Carrier frequency @ ch-251**



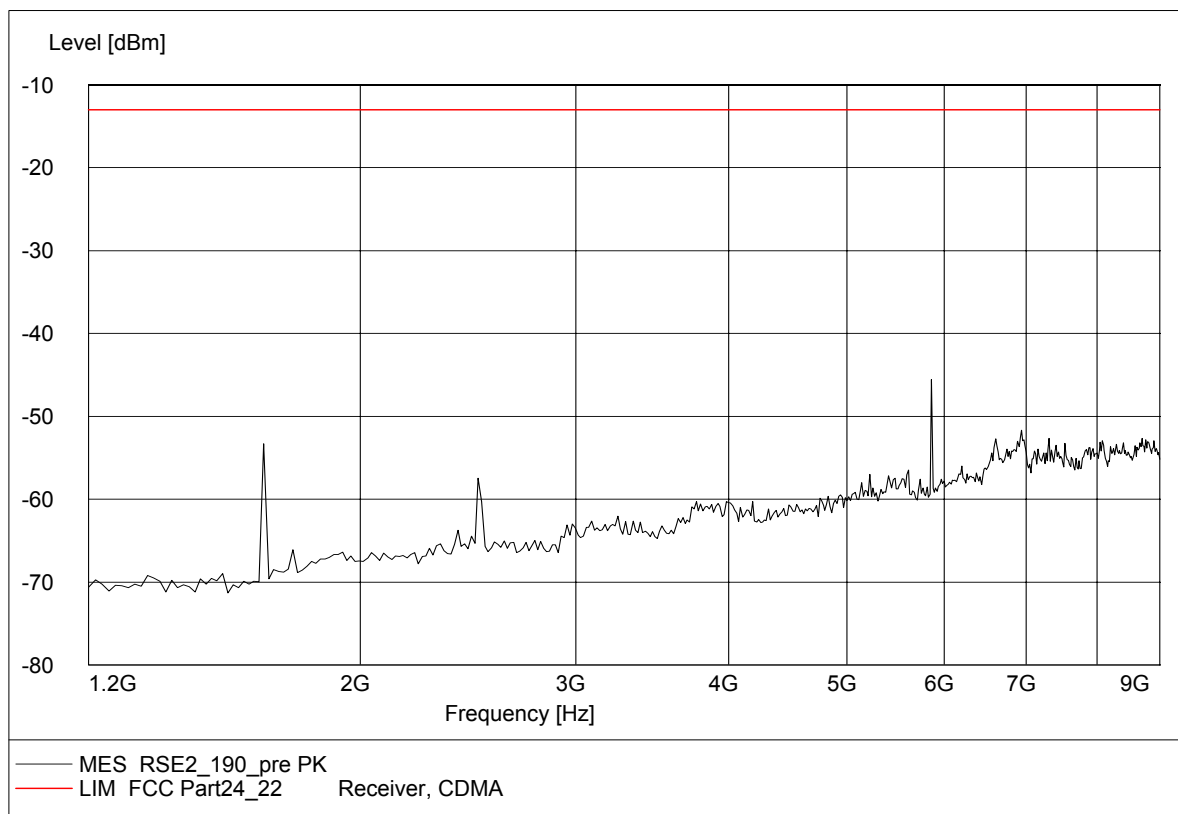
**A.5.3.4 RADIATED SPURIOUS EMISSIONS-Channel 128: 1.2GHz – 9GHz**

**Radiated spurious emission limit :-13dBm.**



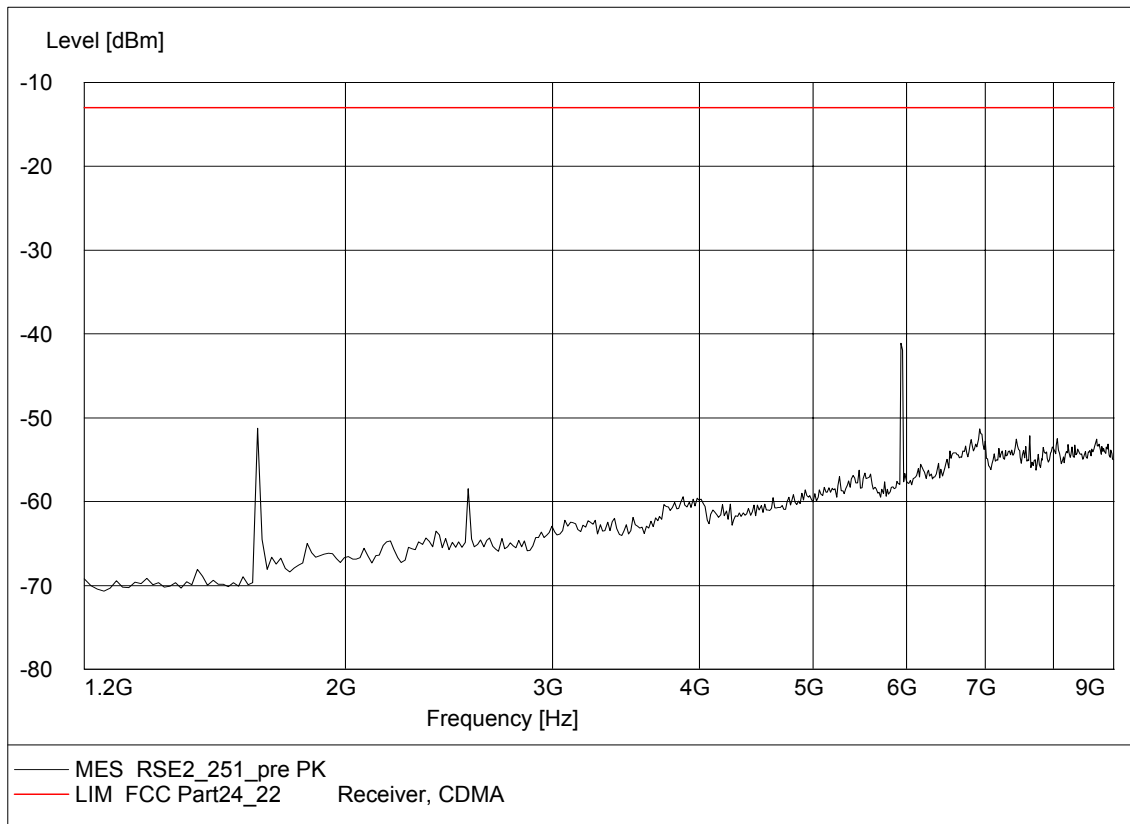
**A5.3.5 RADIATED SPURIOUS EMISSIONS-Channel 190: 1.2GHz – 9GHz**

**Radiated spurious emission limit :-13dBm.**



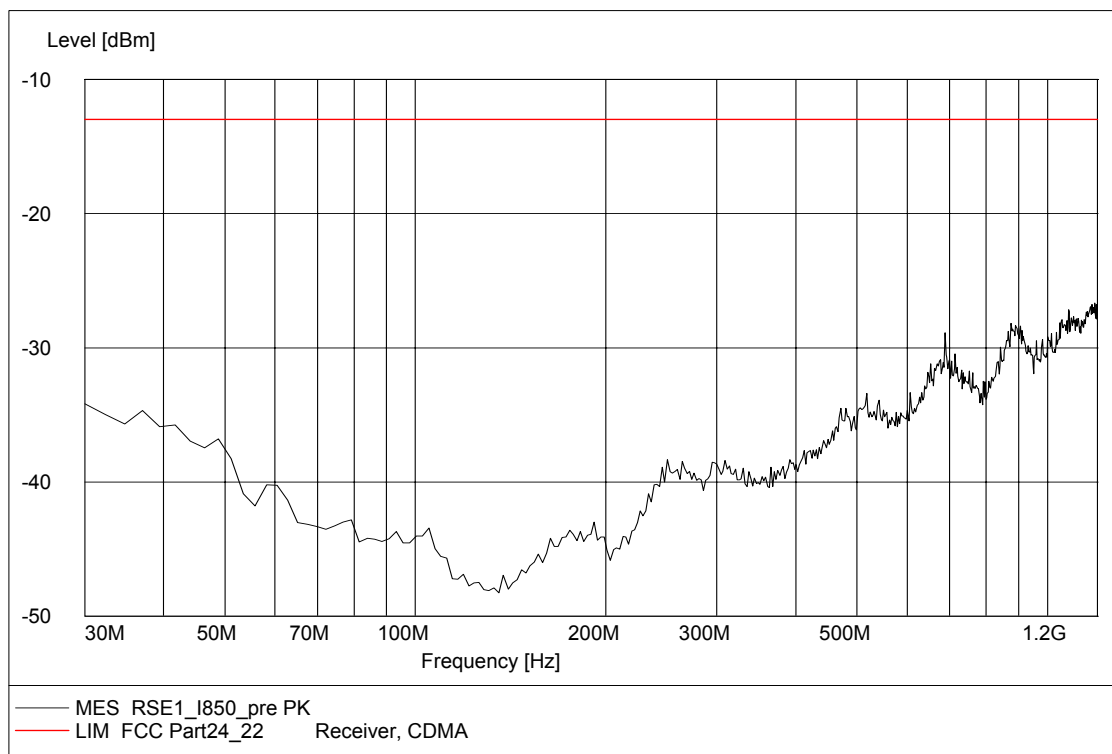
**A.5.3.6 RADIATED SPURIOUS EMISSIONS-Channel 251: 1.2GHz – 9GHz**

**Radiated spurious emission limit :-13dBm.**



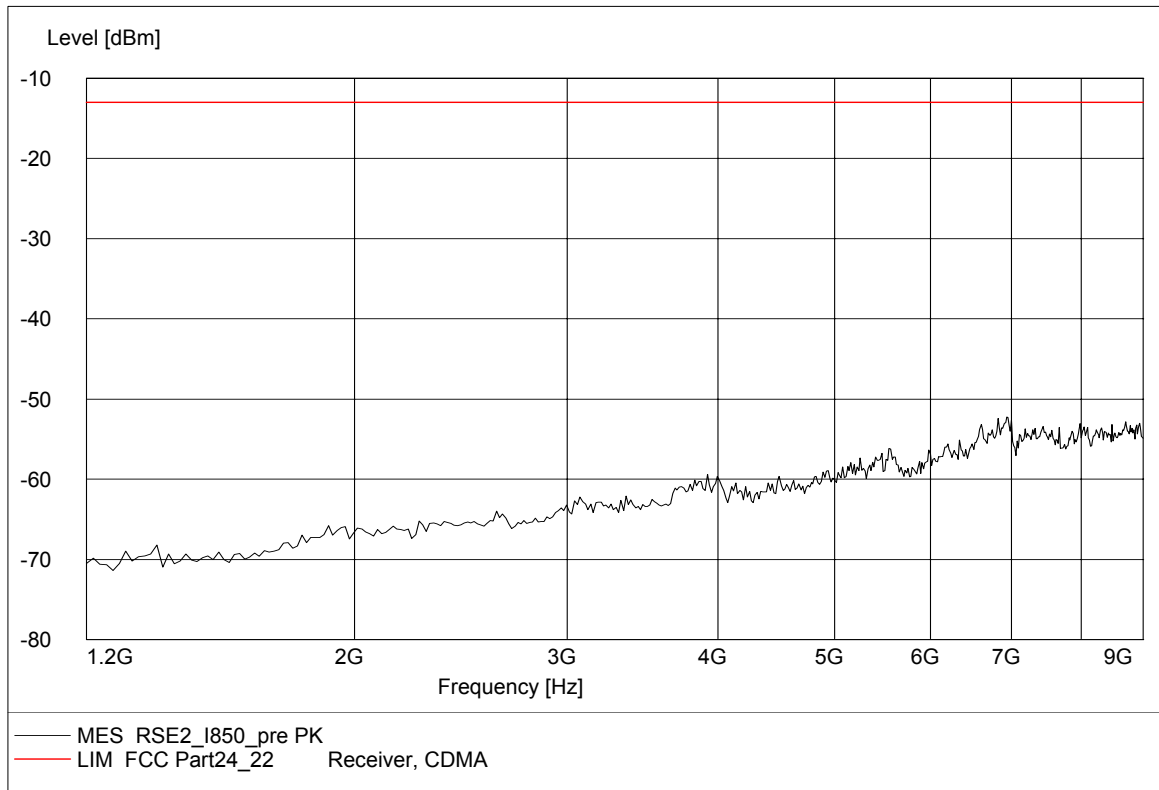
**A.5.3.7 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 30MHz – 1.2GHz**

**Radiated spurious emission limit :-13dBm.**



**A.5.3.8 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 1.2GHz – 9GHz**

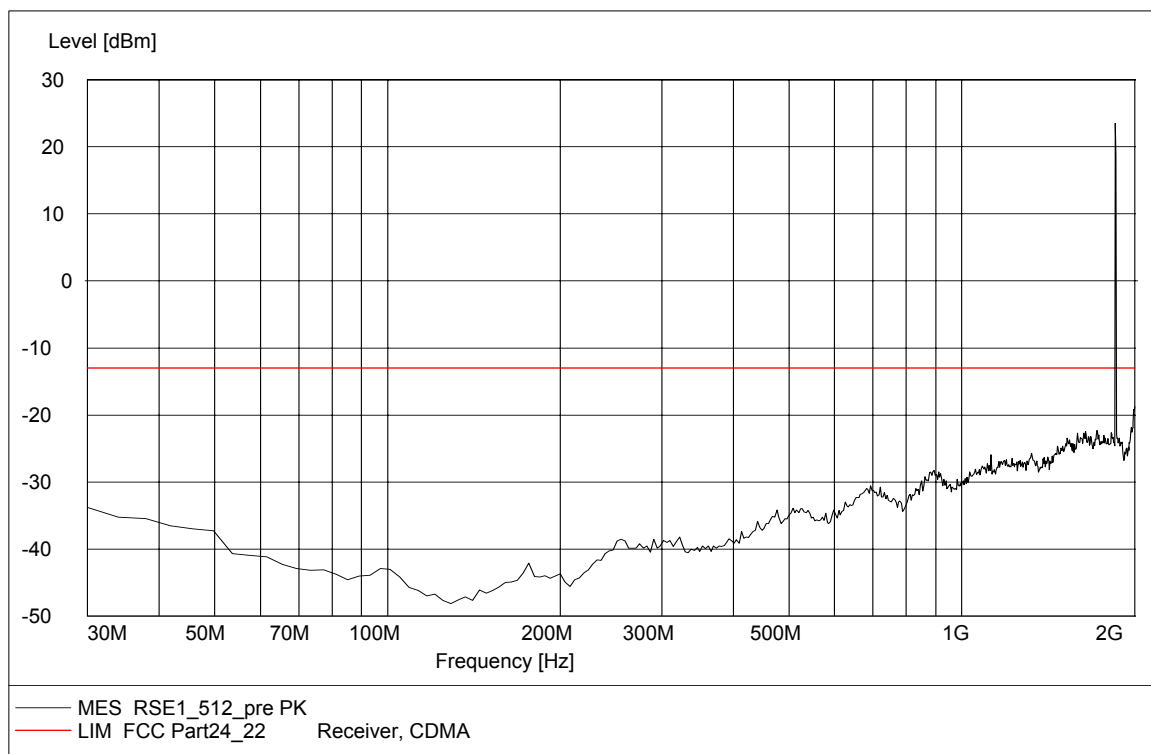
**Radiated spurious emission limit :-13dBm.**



**PCS 1900**

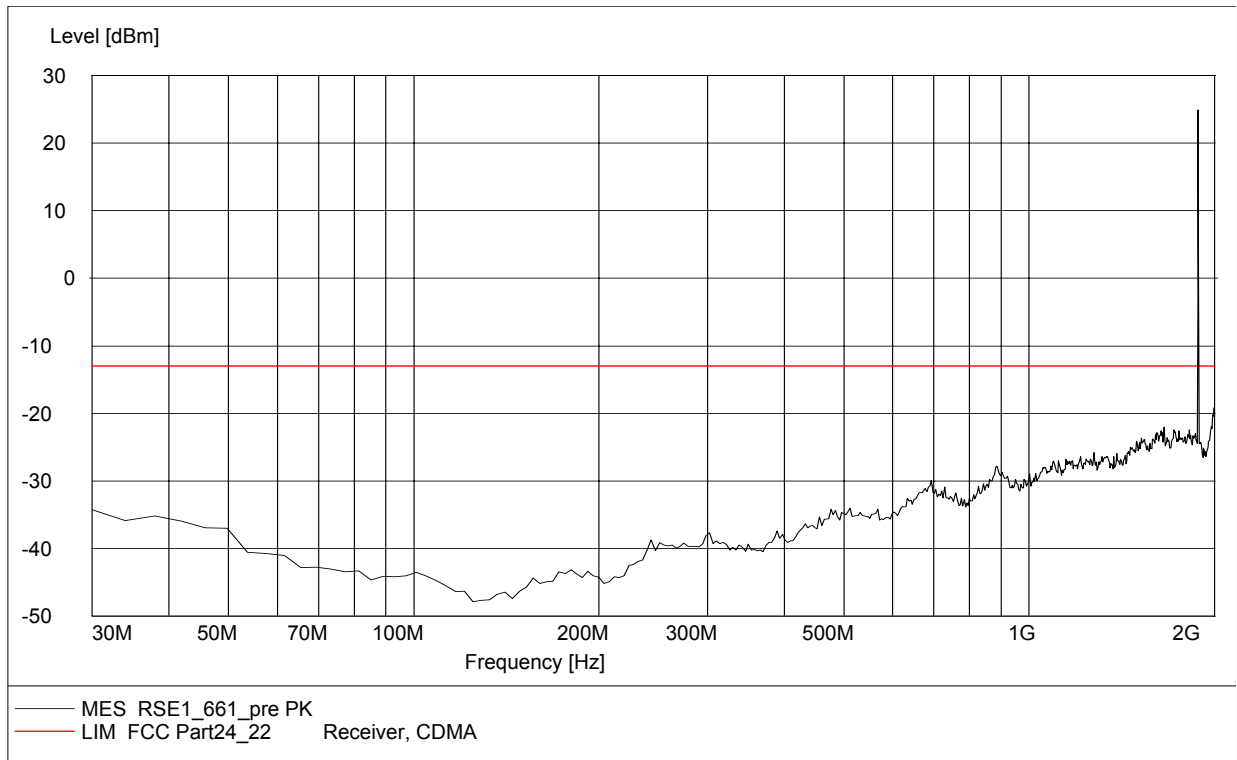
**A.5.3.9 RADIATED SPURIOUS EMISSIONS-Channel 512: 30MHz – 2GHz**

**NOTE: peak above the limit line is the Carrier frequency @ ch-512**



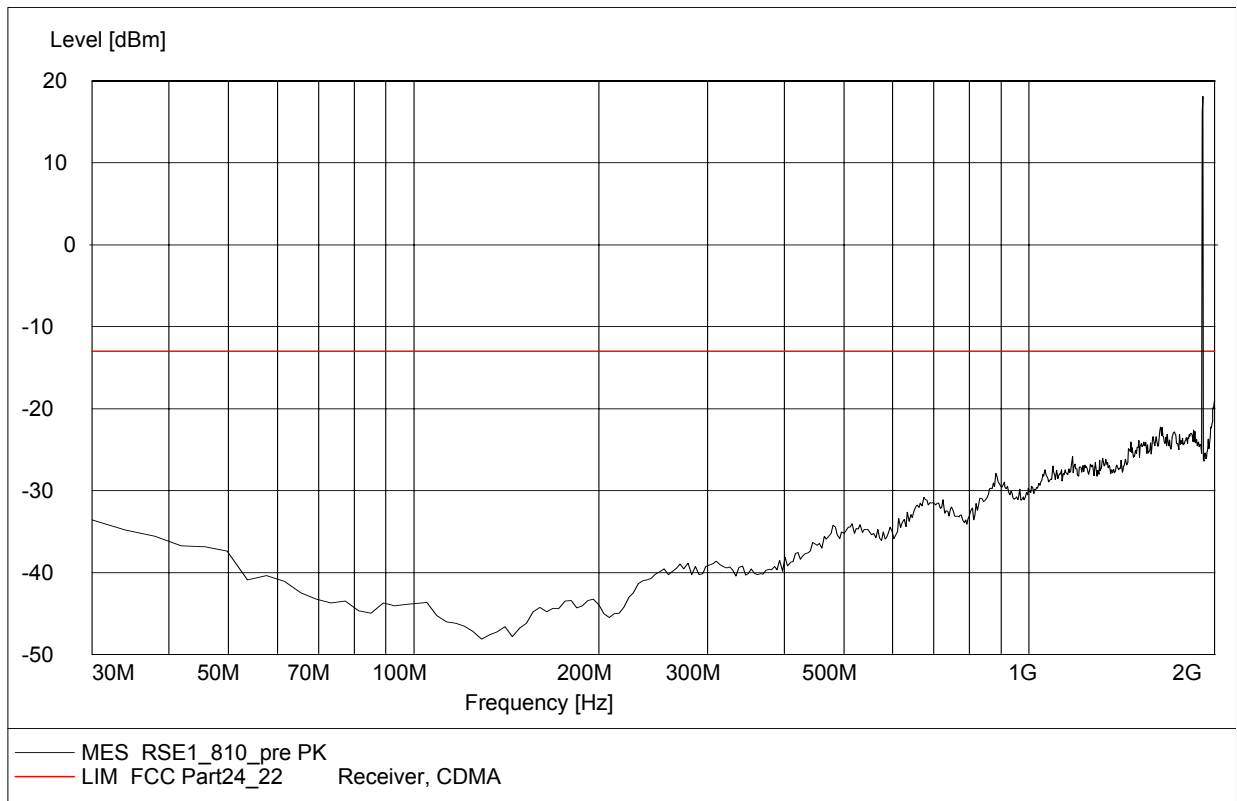
**A.5.3.10 RADIATED SPURIOUS EMISSIONS-Channel 661: 30MHz – 2GHz**

**NOTE:** peak above the limit line is the Carrier frequency @ ch-661

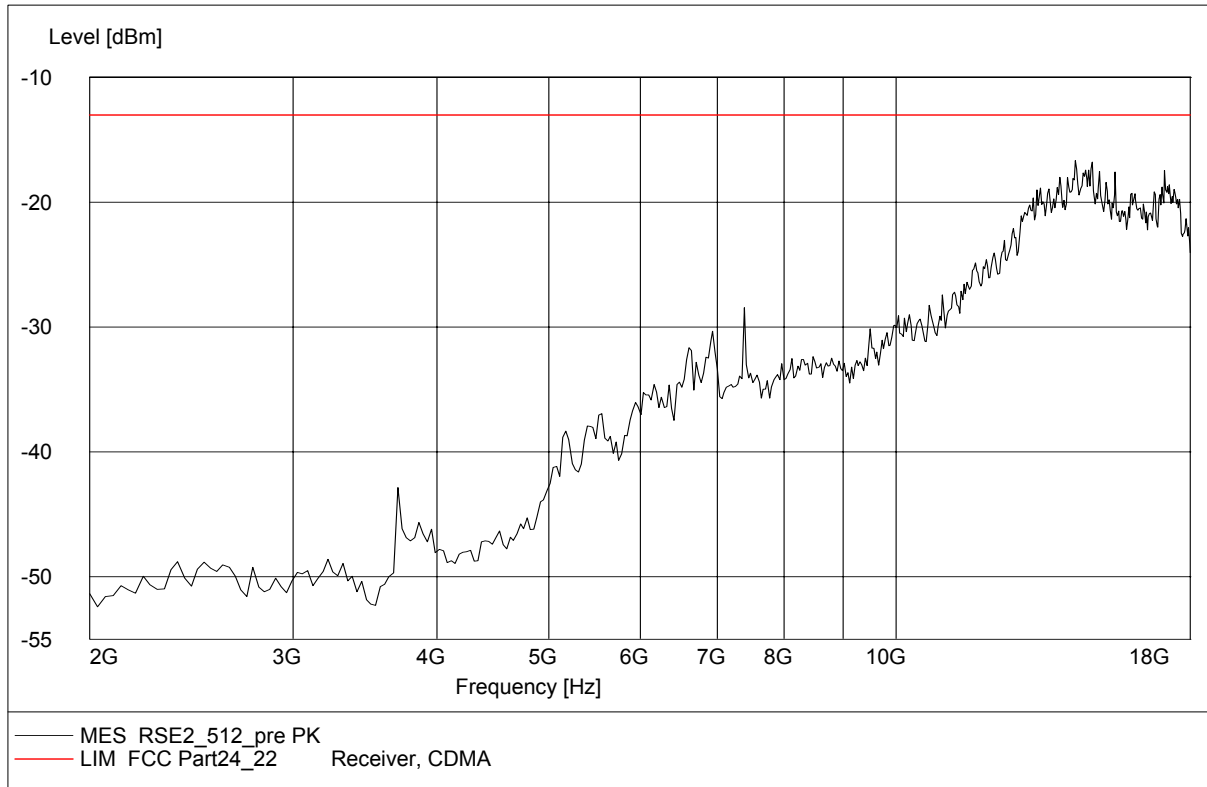


**A.5.3.11 RADIATED SPURIOUS EMISSIONS-Channel 810: 30MHz – 2GHz**

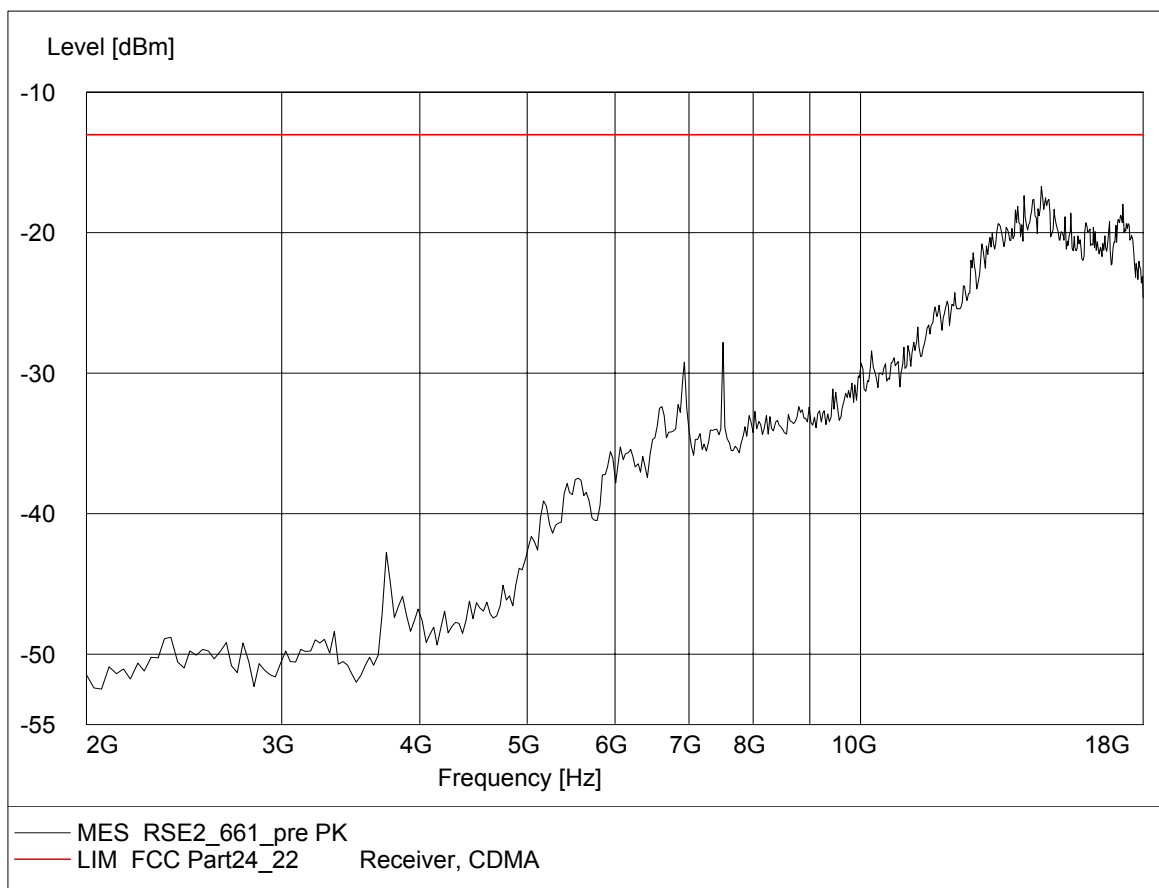
**NOTE:** peak above the limit line is the Carrier frequency @ ch-810



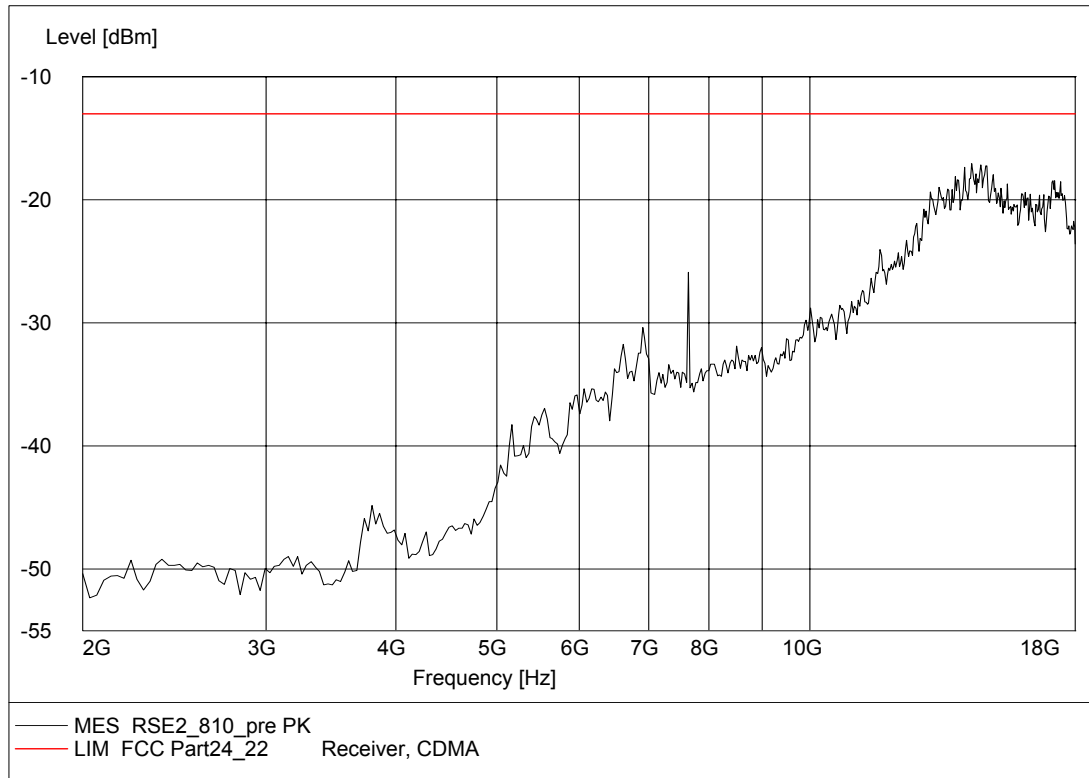
A.5.3.12 RADIATED SPURIOUS EMISSIONS-Channel 512: 2GHz – 18GHz



A5.3.13 RADIATED SPURIOUS EMISSIONS-Channel 661: 2GHz – 18GHz

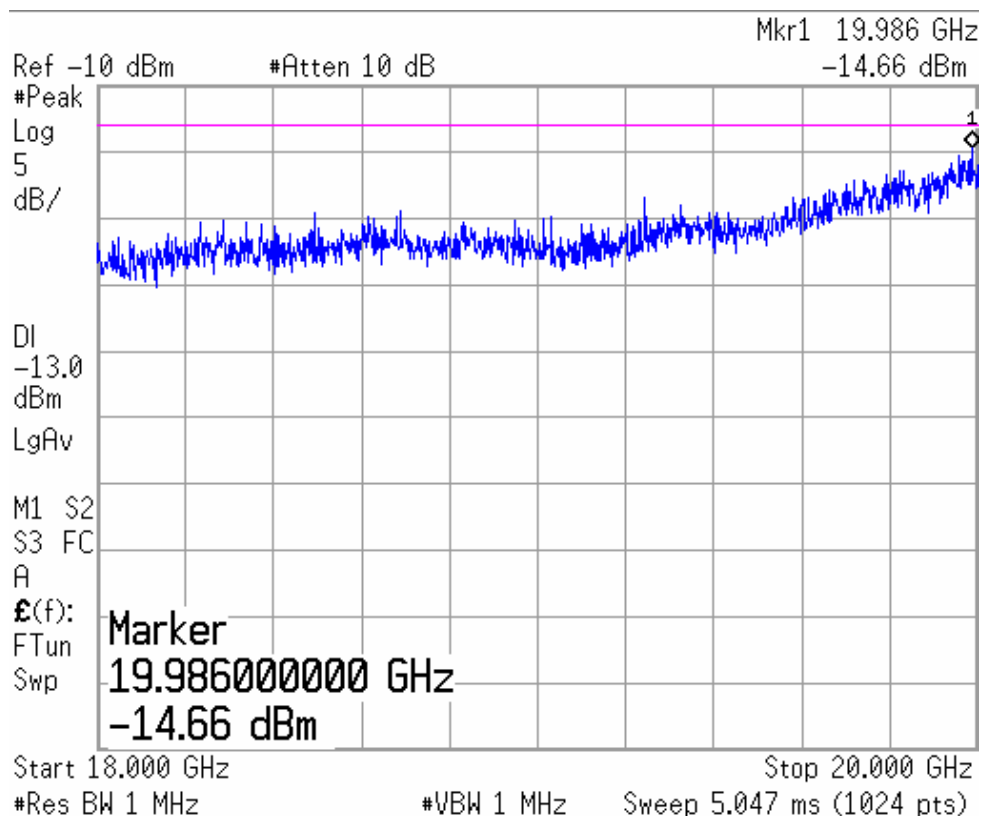


**A.5.3.14 RADIATED SPURIOUS EMISSIONS-Channel 810: 2GHz – 18GHz**

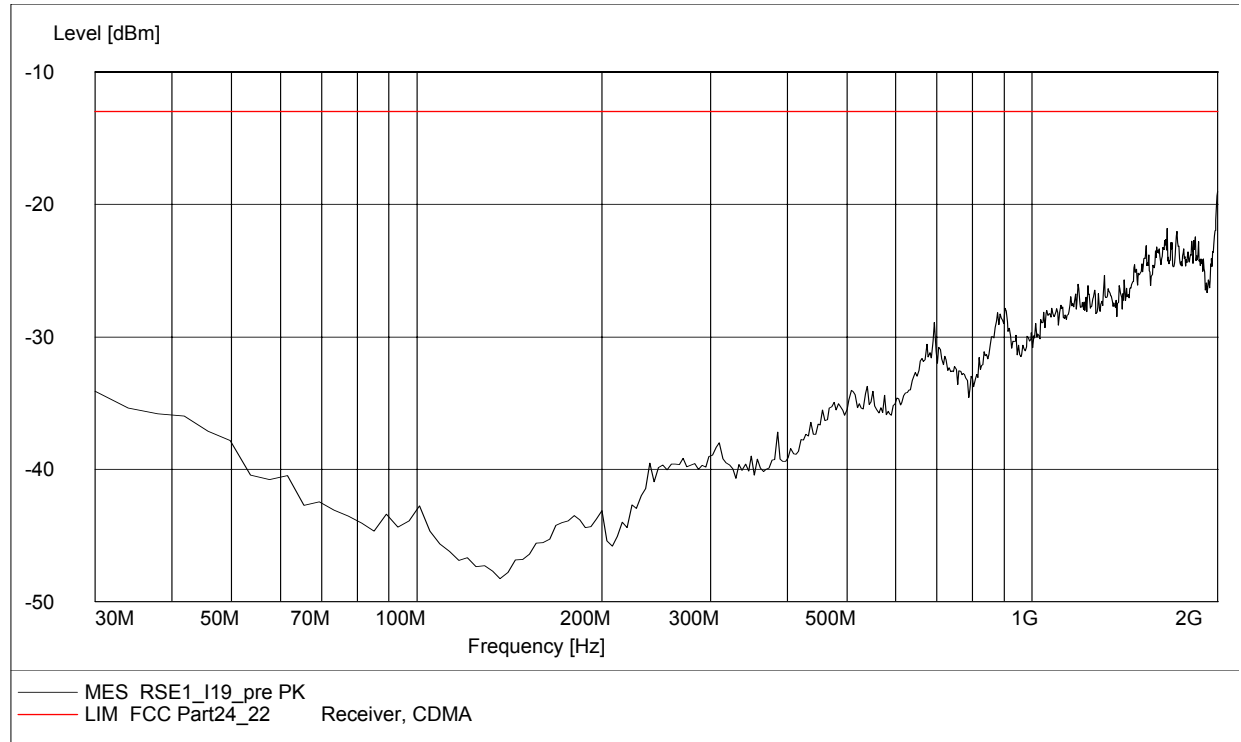


**A.5.3.15 Radiated spurious emission (18GHz-20GHz)**

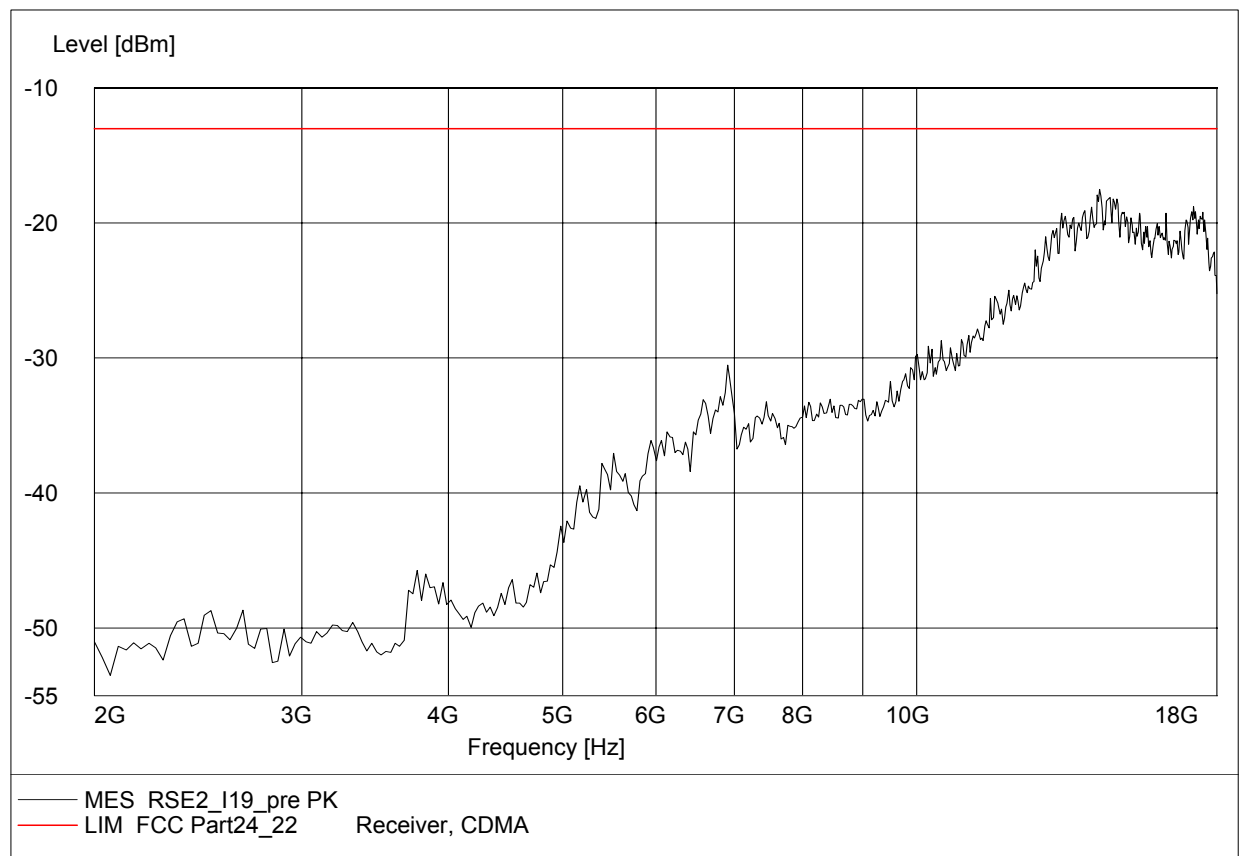
**Note:** This plot is valid for low, mid & high channels (worst-case plot). It is same as the floor noise.



**A.5.3.16 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 30MHz – 2GHz**



**A.5.3.17 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 2GHz – 18GHz**



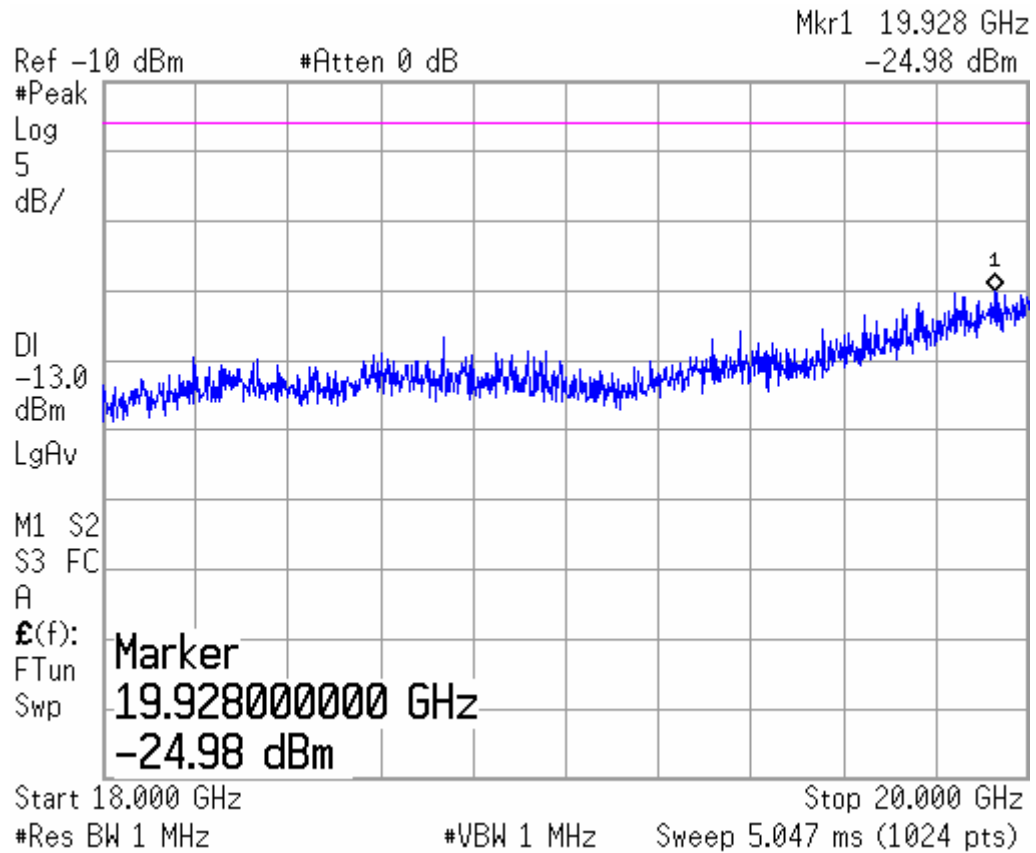
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A.5.3.18 RADIATED SPURIOUS EMISSIONS-EUT in Idle Mode: 18GHz – 20GHz

Note: It is same as the floor noise.



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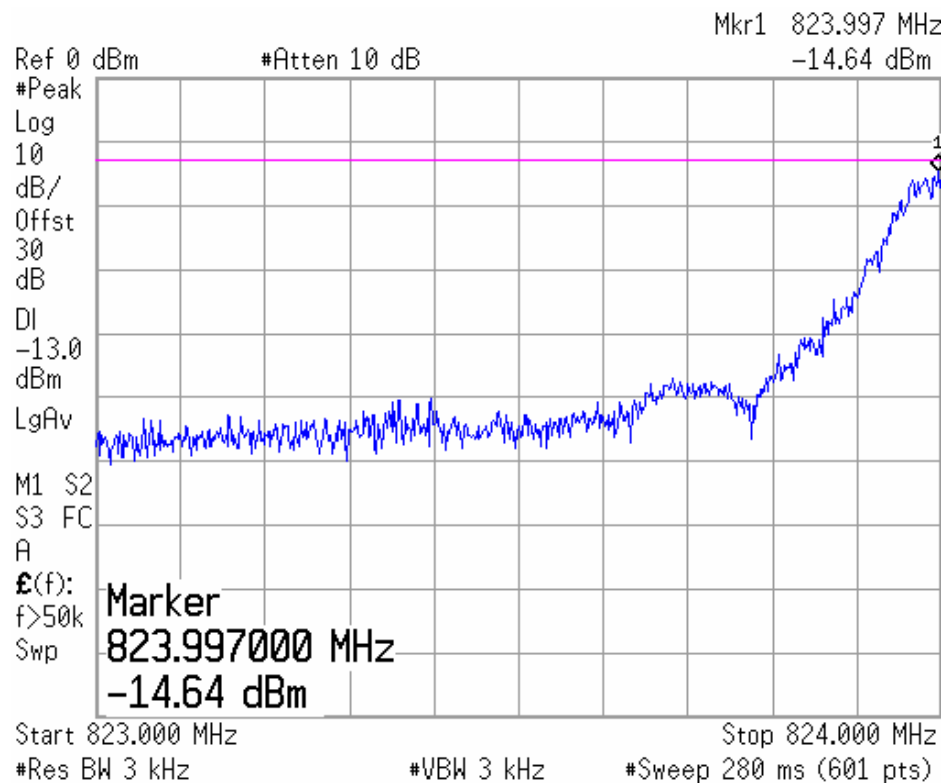
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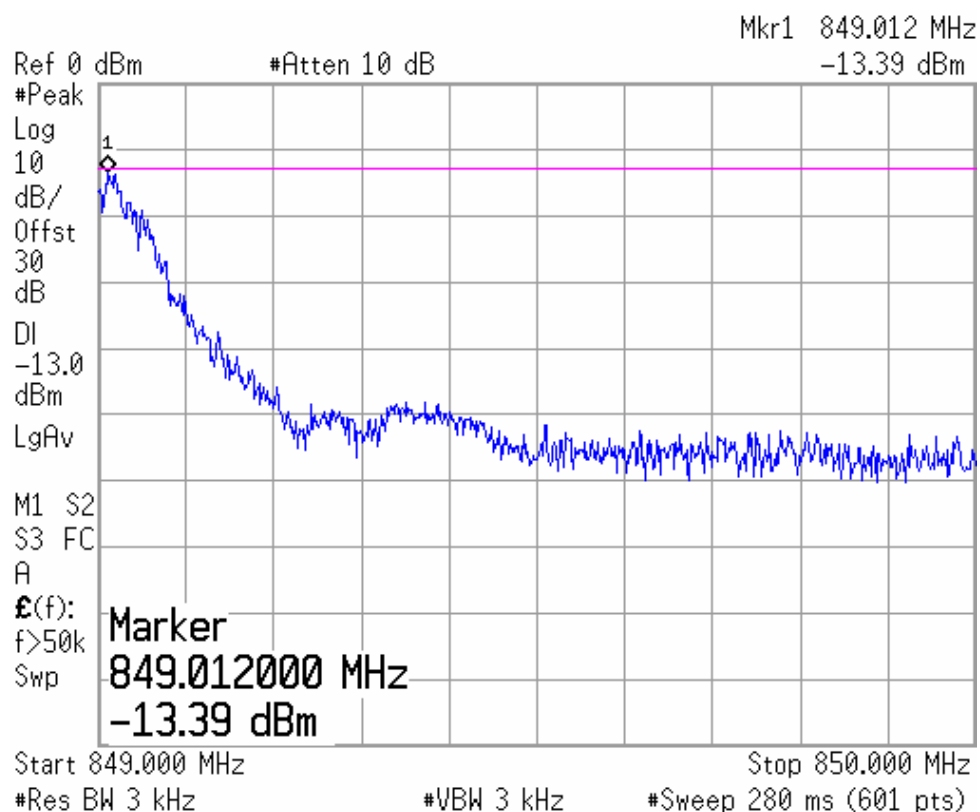
**A.6 BAND EDGE COMPLIANCE (§22.917(b)/§24.238(b))**

**GSM850**

**LOW BAND EDGE BLOCK-A (GSM850)-Channel 128**



**HIGH BAND EDGE BLOCK-C (GSM850) -Channel 251**



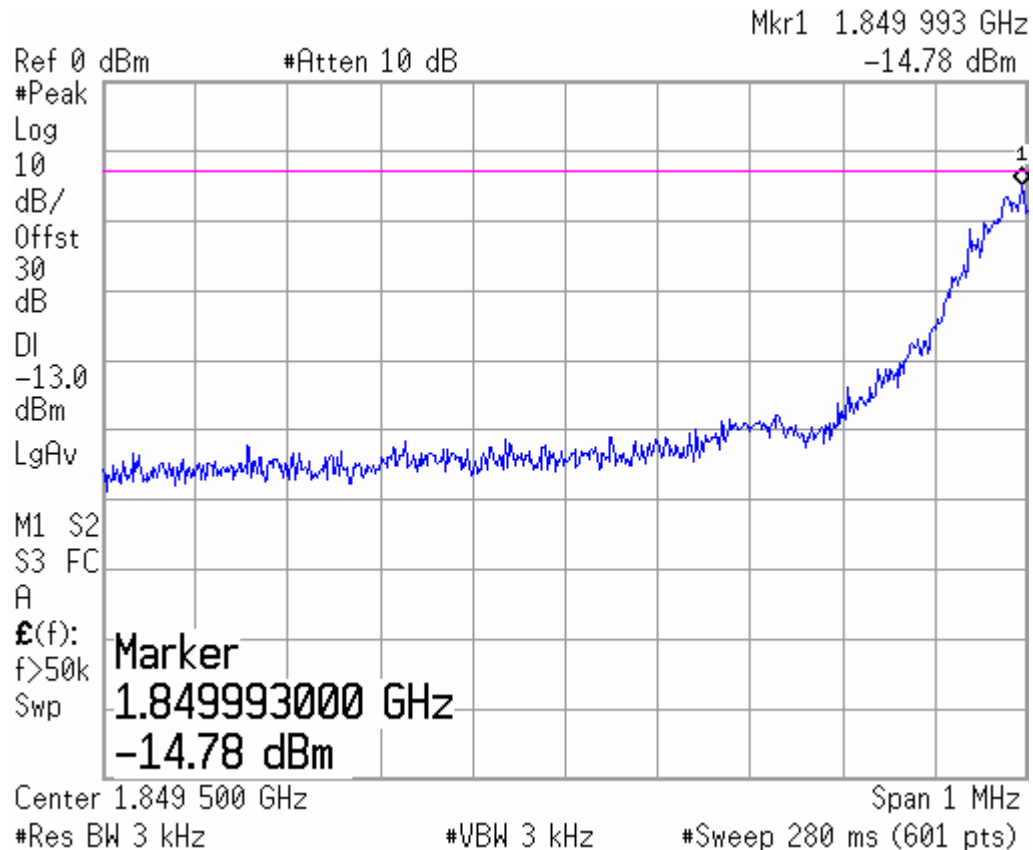
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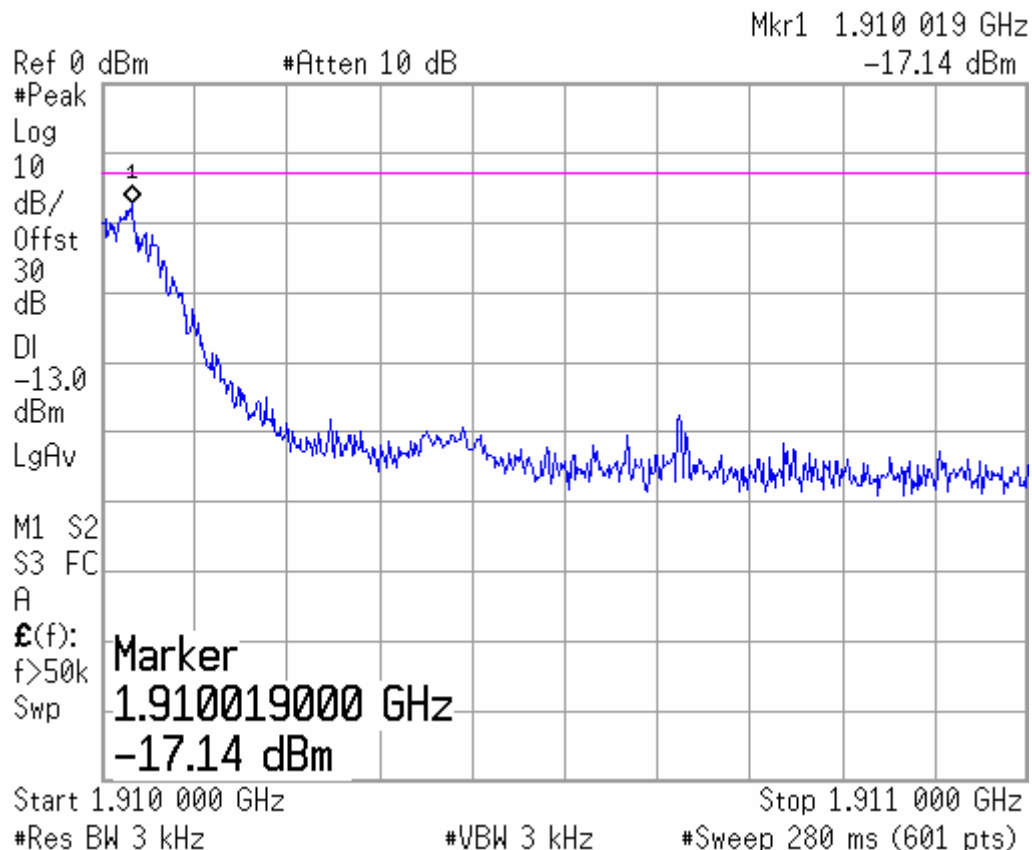
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PCS 1900

LOW BAND EDGE BLOCK-A (PCS-1900)-Channel 512



HIGH BAND EDGE BLOCK-C (PCS-1900) -Channel 810



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**A.7 CONDUCTED SPURIOUS EMISSION (§2.1057/§22.917/§24.238)**

**A.7.1 Measurement Method**

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

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 9 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

**GSM850 Transmitter**

| Channel | Frequency (MHz) |
|---------|-----------------|
| 128     | 824.2           |
| 190     | 836.6           |
| 251     | 848.8           |

**PCS1900 Transmitter**

| Channel | Frequency (MHz) |
|---------|-----------------|
| 512     | 1850.2          |
| 661     | 1880.0          |
| 810     | 1909.8          |

**A.7.2 Measurement Limit**

Sec. 24.238 Emission Limits.

(a) On any frequency outside frequency band of the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least  $43+10\log(P)$  dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

**A.7.3 Measurement result**

**GSM850**

| Harmonic | Tx ch. 128<br>Freq.<br>(MHz) | Level<br>(dBm) | Tx ch. 190<br>Freq.<br>(MHz) | Level<br>(dBm) | Tx ch.<br>Freq.<br>(MHz) 251 | Level<br>(dBm) |
|----------|------------------------------|----------------|------------------------------|----------------|------------------------------|----------------|
| 2        | 1648.4                       | nf             | 1673.2                       | nf             | 1697.6                       | nf             |
| 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

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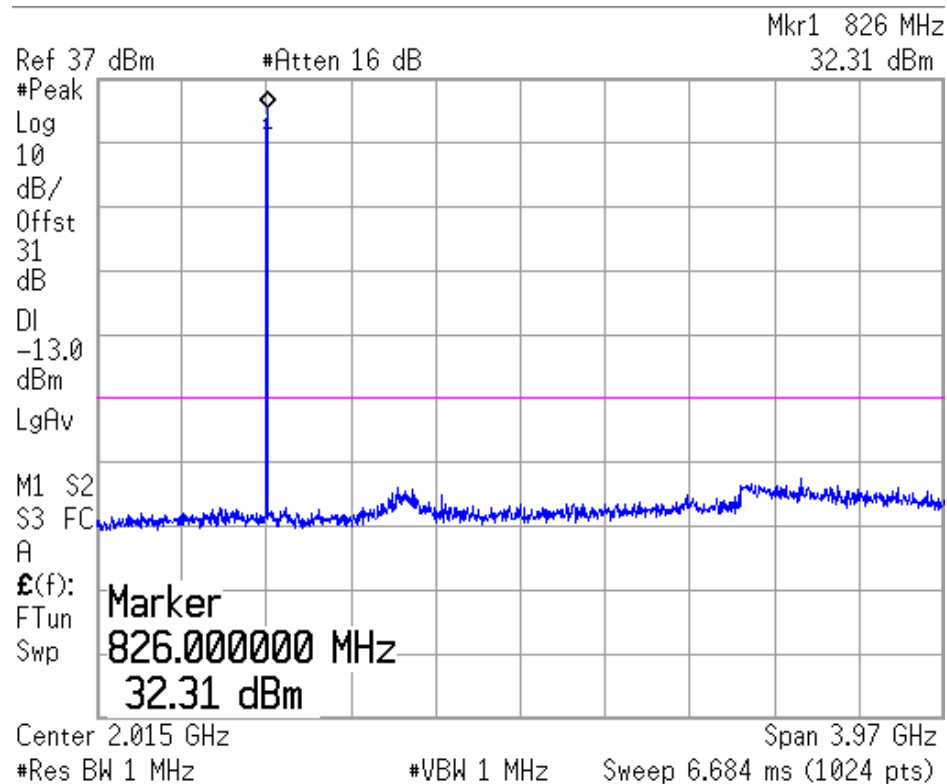
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**A.7.3.1 Channel 128: 30MHz – 4GHz**

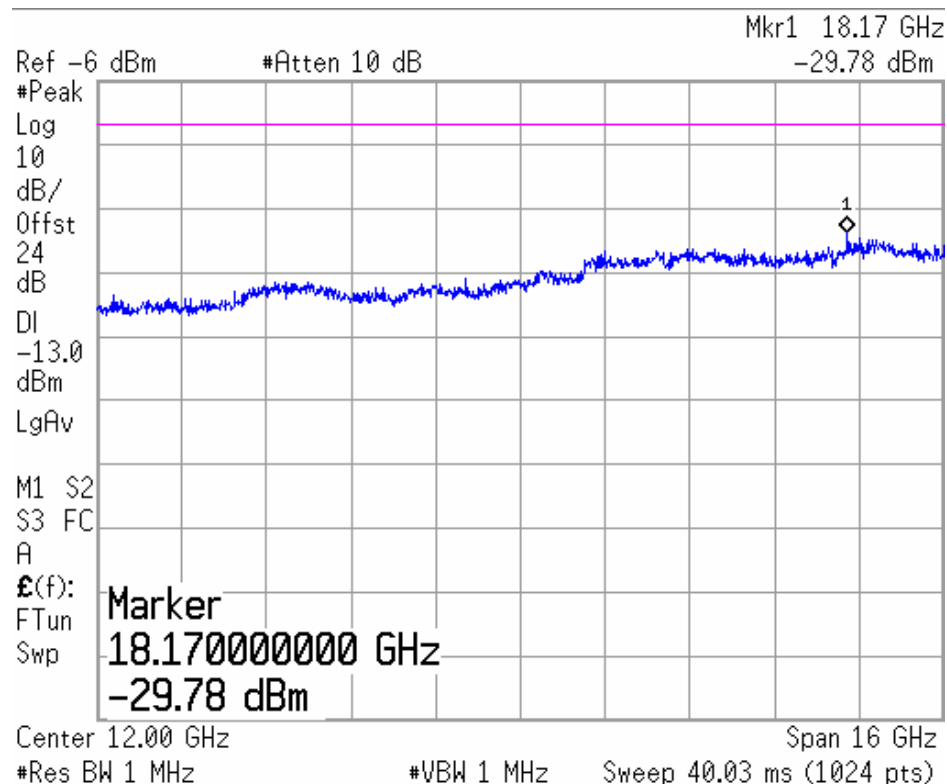
Spurious emission limit –13dBm.

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



**A.7.3.2 Channel 128: 4GHz – 20GHz**

Spurious emission limit –13dBm.



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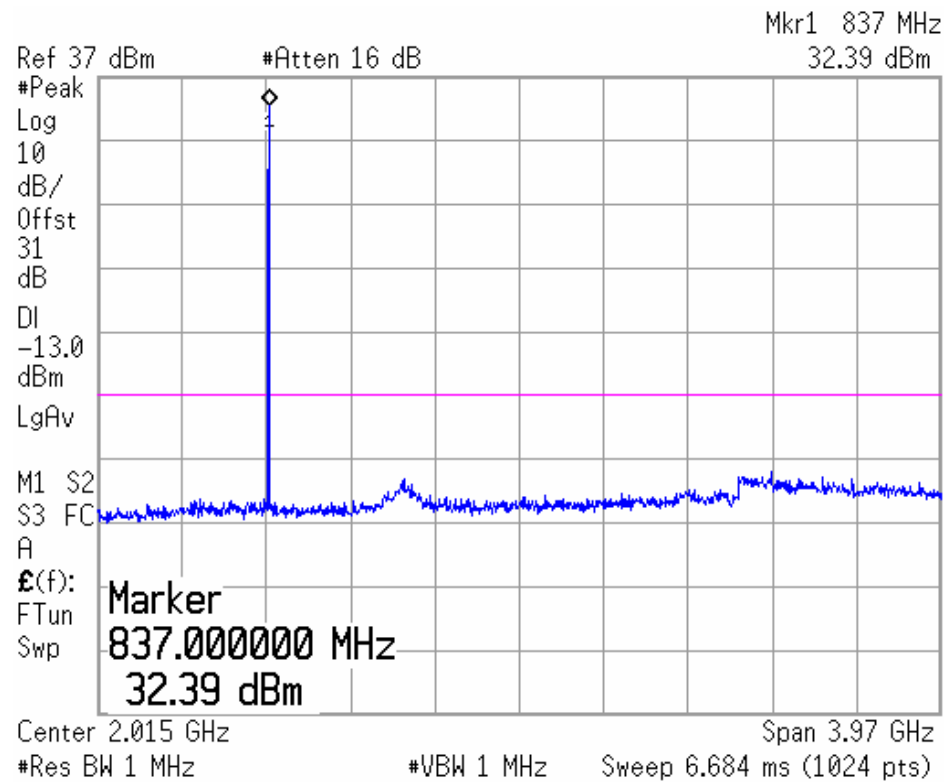
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**A.7.3.3 Channel 190: 30MHz – 4GHz**

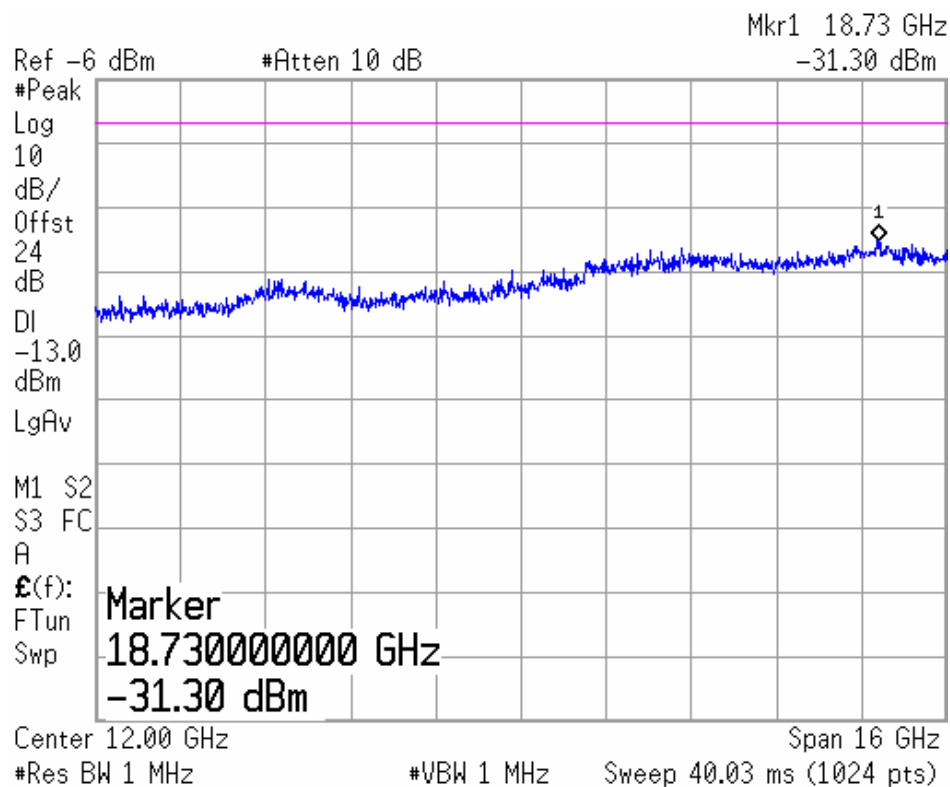
Spurious emission limit –13dBm

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



**A.7.3.4 Channel 190: 4GHz –20GHz**

Spurious emission limit –13dBm



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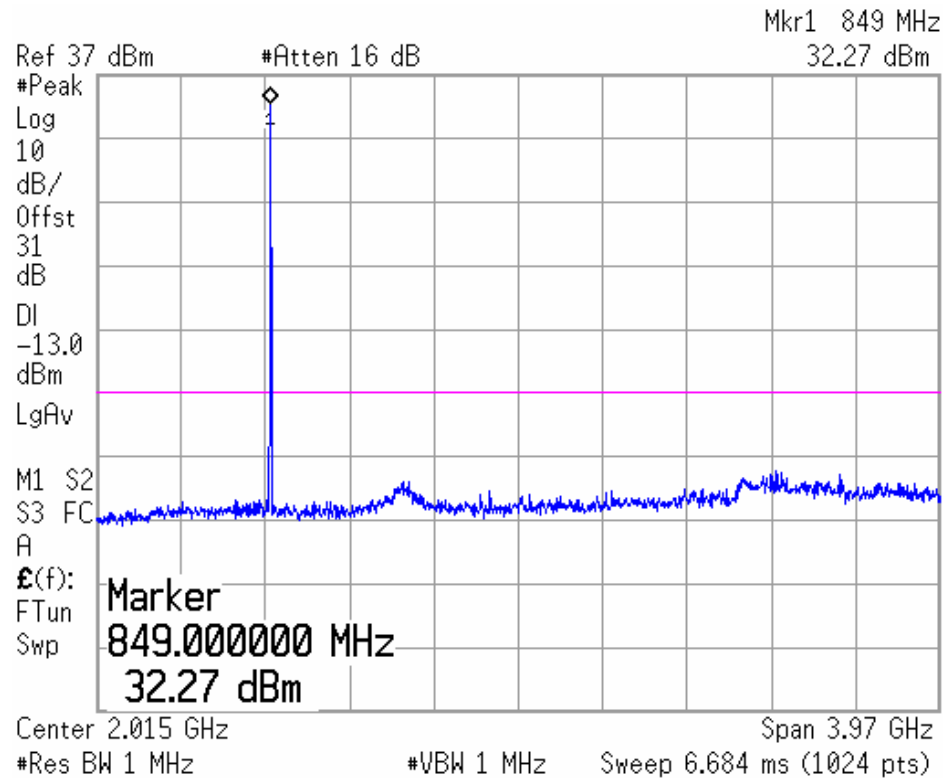
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**A.7.3.5 Channel 251: 30MHz – 4GHz**

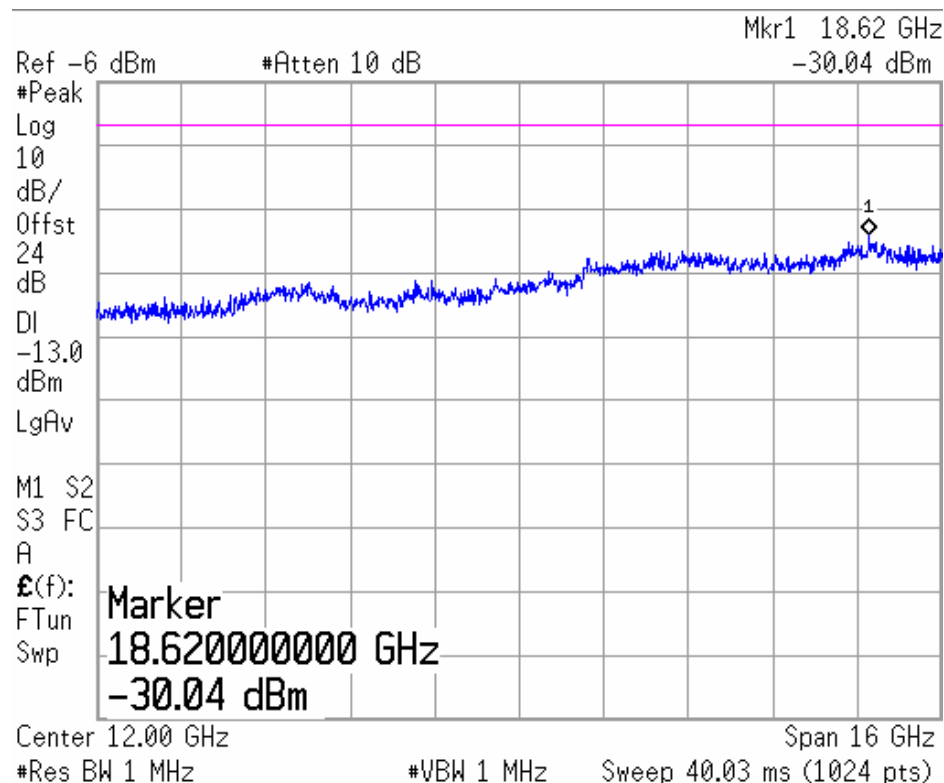
Spurious emission limit –13dBm.

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



**A.7.3.6 Channel 251: 4GHz – 20GHz**

Spurious emission limit –13dBm.



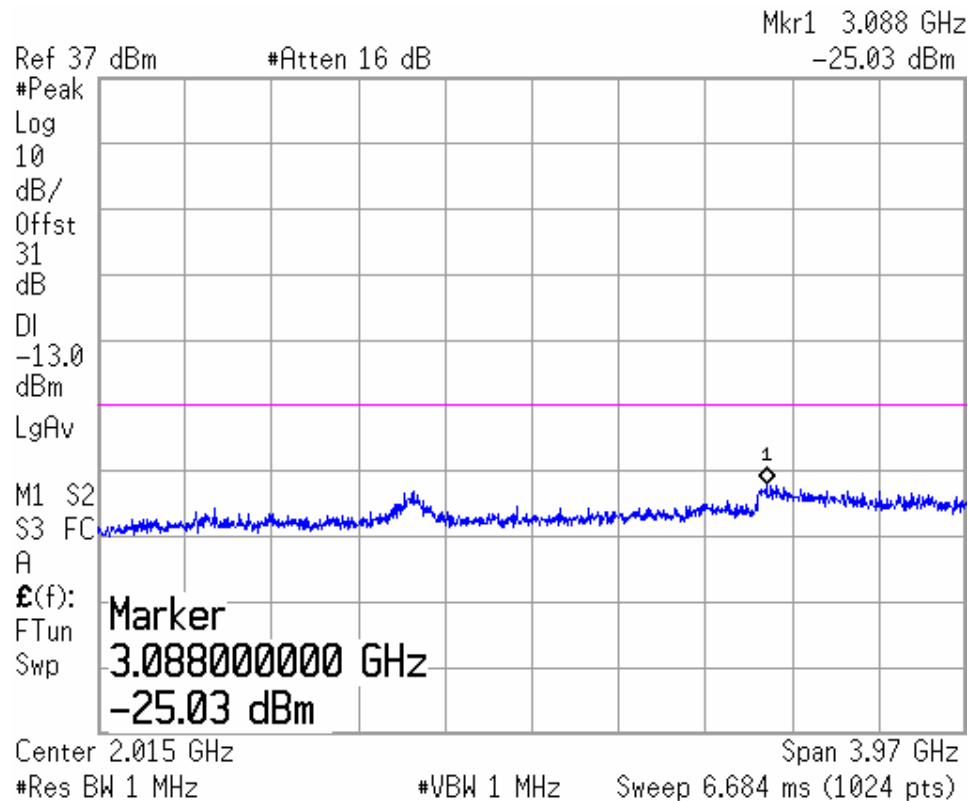
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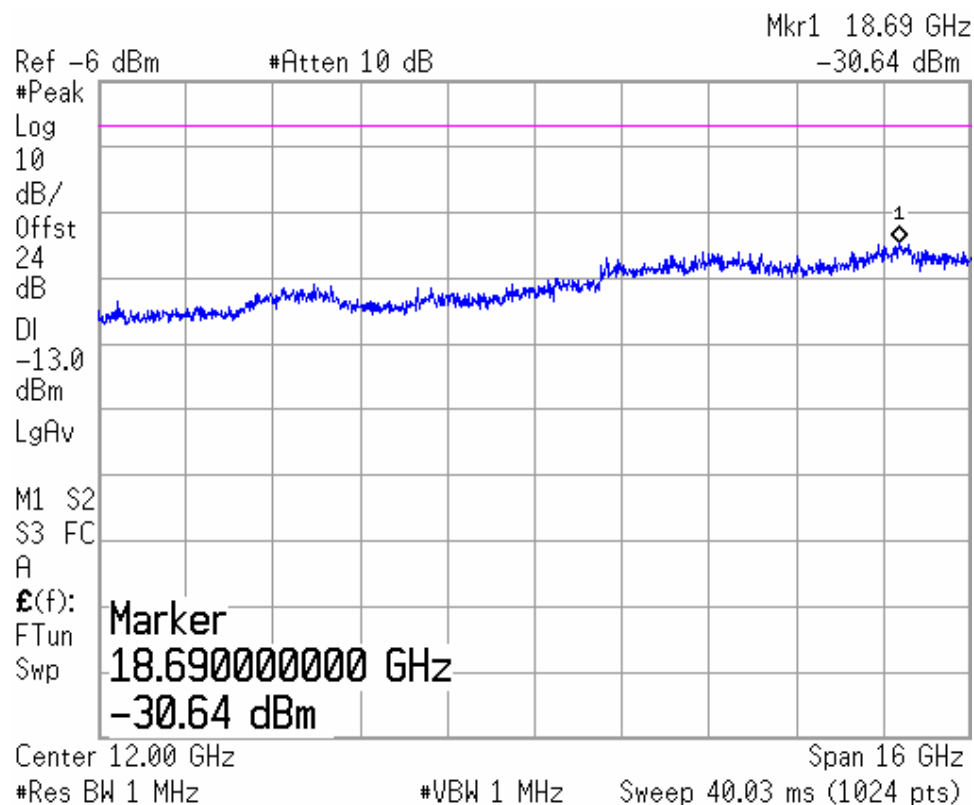
**A.7.3.7 Idle mode: 30MHz – 4GHz**

Spurious emission limit –13dBm.



**A.7.3.8 Idle mode: 4GHz – 20GHz**

Spurious emission limit –13dBm.



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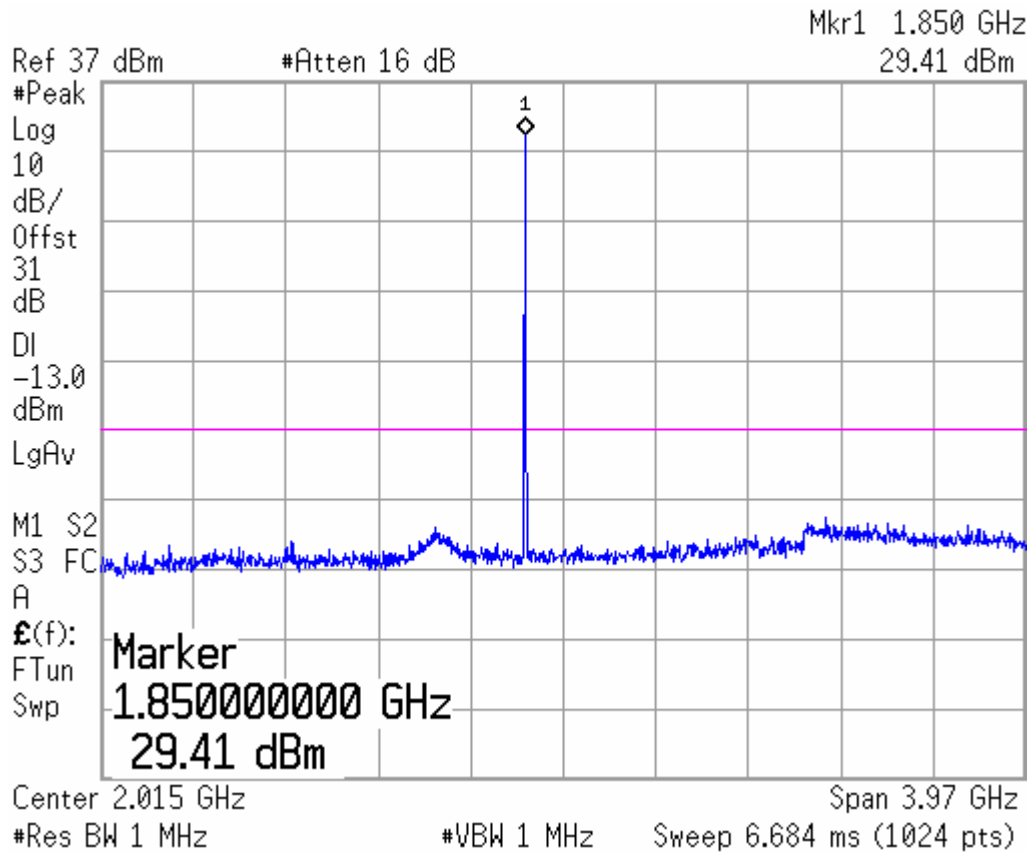
**PCS1900**

| Harmonic        | Tx ch. 512<br>Freq.<br>(MHz) | Level<br>(dBm) | Tx ch. 661<br>Freq.<br>(MHz) | Level<br>(dBm) | Tx ch. 810<br>Freq.<br>(MHz) | Level<br>(dBm) |
|-----------------|------------------------------|----------------|------------------------------|----------------|------------------------------|----------------|
| 2               | 3700.4                       | nf             | 3760                         | nf             | 3819.6                       | nf             |
| 3               | 5550.6                       | nf             | 5640                         | nf             | 5729.4                       | nf             |
| 4               | 7400.8                       | nf             | 7520                         | nf             | 7639.2                       | nf             |
| 5               | 9251.0                       | nf             | 9400                         | nf             | 9549.0                       | 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              | 18502.0                      | nf             | 18800                        | nf             | 19098.0                      | nf             |
| nf: Noise floor |                              |                |                              |                |                              |                |

**A.7.3.9 Channel 512: 30MHz – 4GHz**

Spurious emission limit –13dBm.

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



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**A.7.3.10 Channel 512: 4GHz – 20GHz**

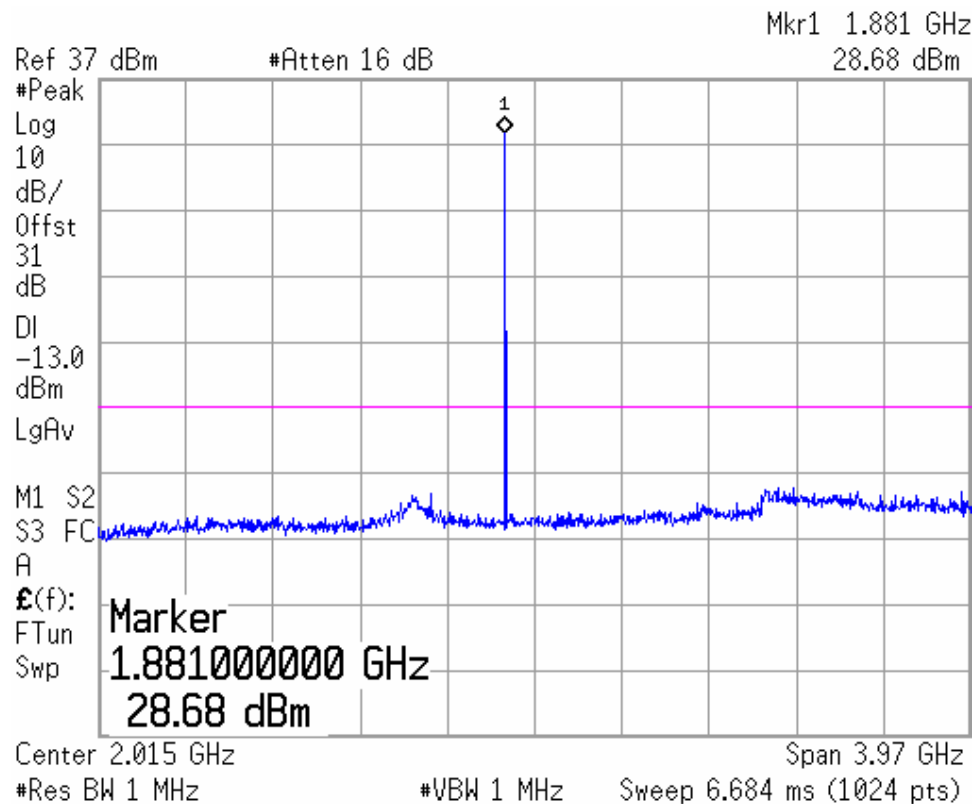
Spurious emission limit –13dBm.



**A.7.3.11 Channel 661: 30MHz – 4GHz**

Spurious emission limit –13dBm

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



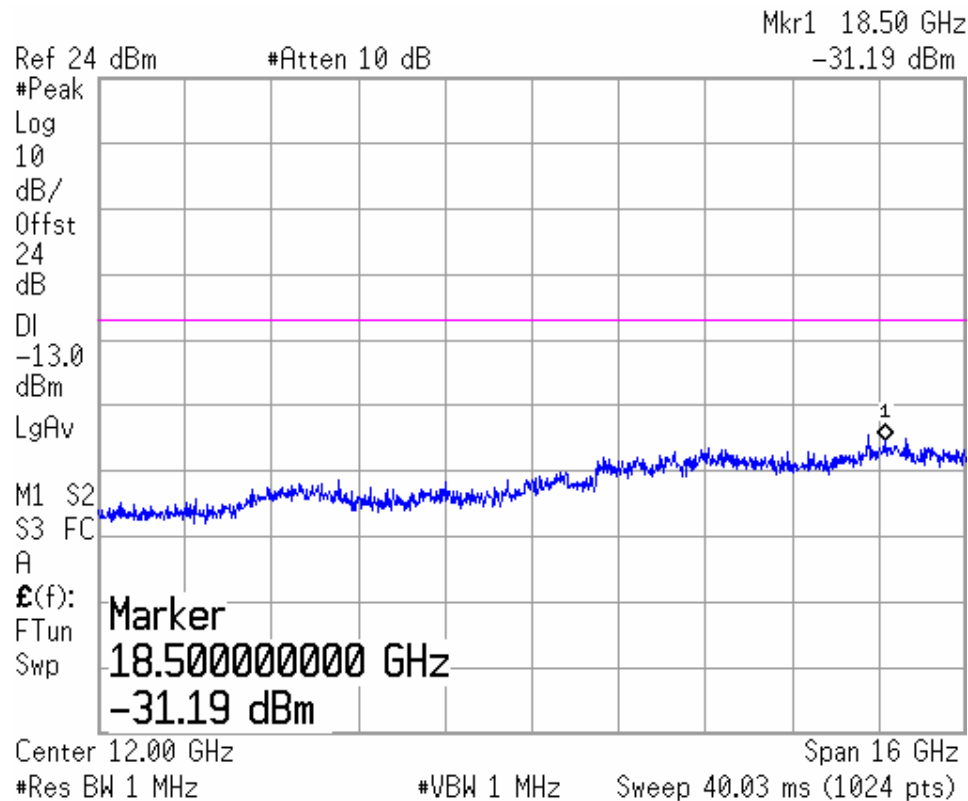
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**A.7.3.12 Channel 661: 4GHz – 20GHz**

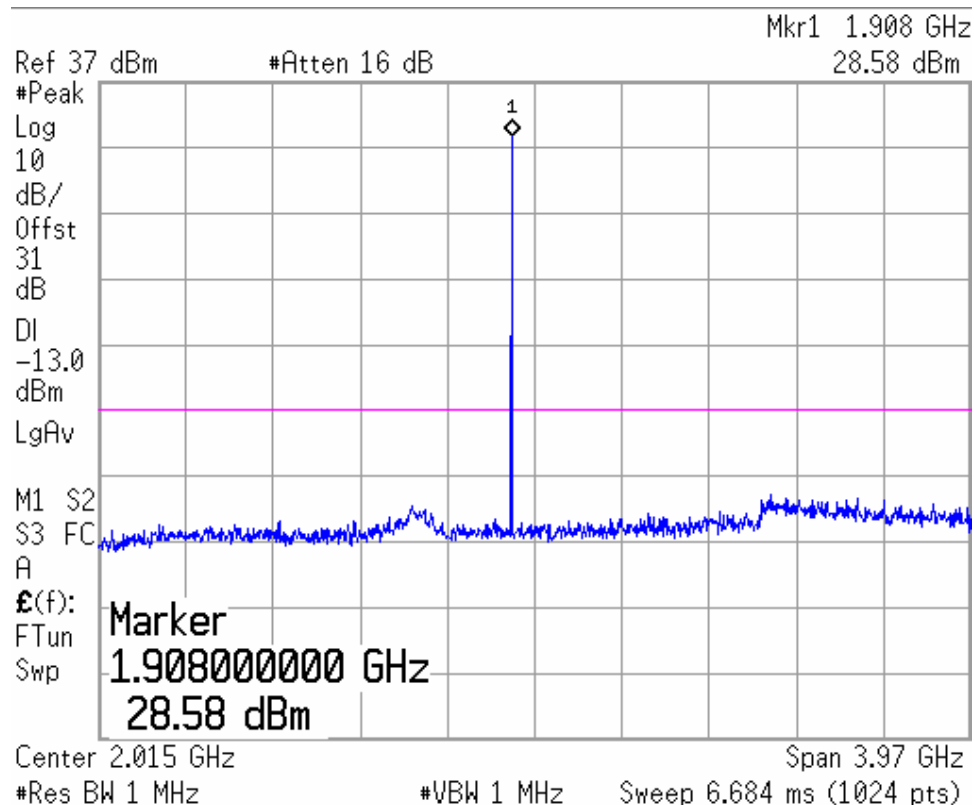
Spurious emission limit –13dBm



**A.7.3.13 Channel 810: 30MHz – 4GHz**

Spurious emission limit –13dBm.

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



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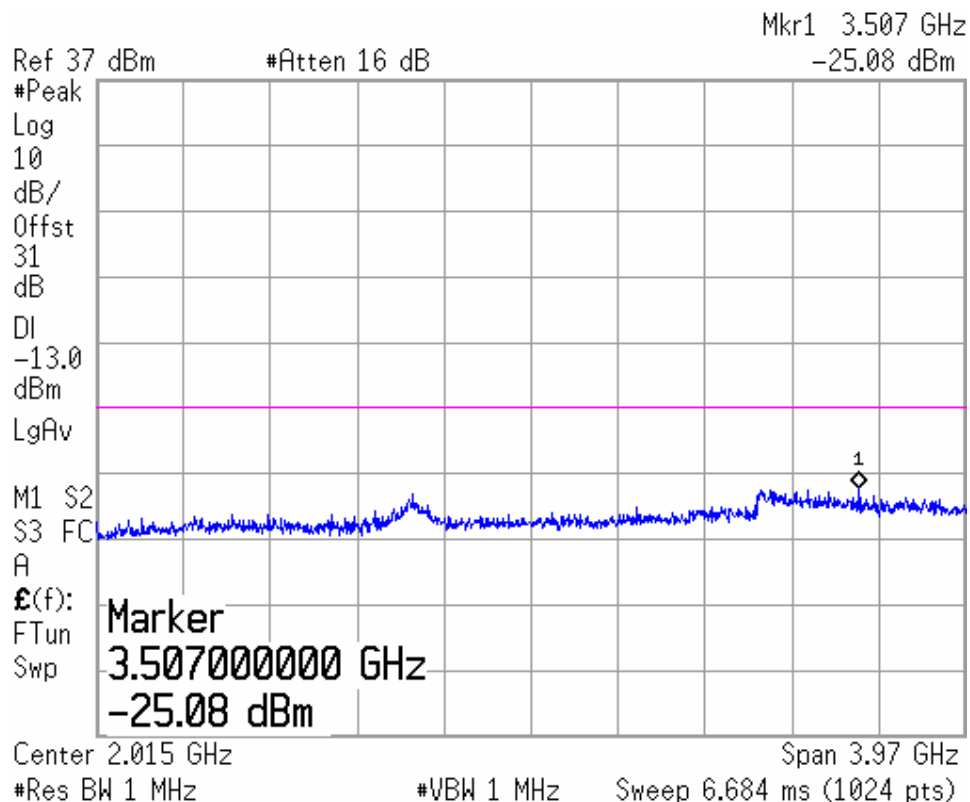
**A.7.3.14 Channel 810: 4GHz – 20GHz**

Spurious emission limit –13dBm.



**A.7.3.15 Idle mode: 30MHz – 4GHz**

Spurious emission limit –13dBm.



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**A.7.3.16 Idle mode: 4GHz – 20GHz**

Spurious emission limit –13dBm.



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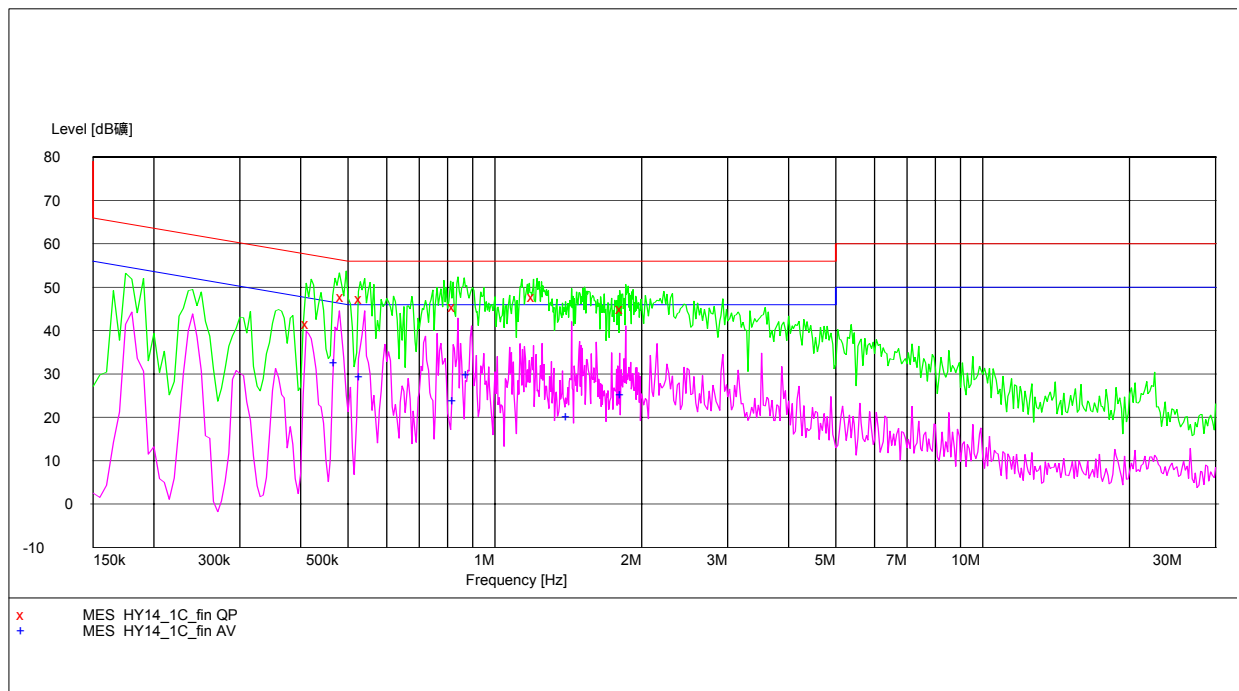
**A.8 CONDUCTED EMISSION (§15.107/§207)**

**A.8.1 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

**A.8.2 Measurement result**



**MEASUREMENT RESULT: "HY14\_1C\_fin QP"**

8/8/05 15:45

| Frequency<br>MHz | Level<br>dBμV | Transd<br>dB | Limit<br>dBμV | Margin<br>dB | Line | PE  |
|------------------|---------------|--------------|---------------|--------------|------|-----|
| 0.420000         | 41.70         | 10.1         | 57            | 15.7         | N    | FLO |
| 0.495000         | 47.90         | 10.1         | 56            | 8.2          | L1   | GND |
| 0.540000         | 47.30         | 10.1         | 56            | 8.7          | L1   | GND |
| 0.840000         | 45.60         | 10.1         | 56            | 10.4         | L1   | GND |
| 1.220000         | 47.70         | 10.2         | 56            | 8.3          | L1   | GND |
| 1.855000         | 45.00         | 10.1         | 56            | 11.0         | L1   | GND |

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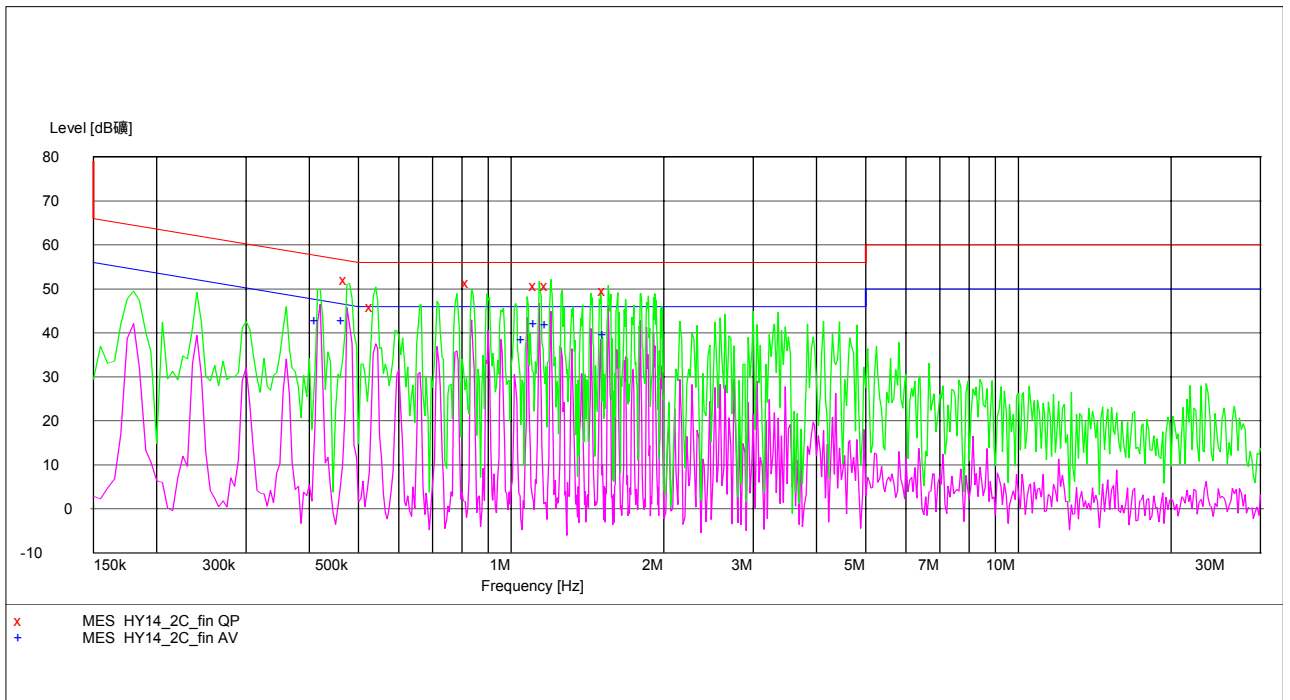
**No. FCC-PART-24-2005007**

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**MEASUREMENT RESULT: "HY14\_1C\_fin AV"**

8/8/05 15:45

| Frequency<br>MHz | Level<br>dB $\mu$ V | Transd<br>dB | Limit<br>dB | Margin<br>dB $\mu$ V | Line<br>dB | PE  |
|------------------|---------------------|--------------|-------------|----------------------|------------|-----|
| 0.480000         | 32.60               | 10.1         | 46          | 13.8                 | L1         | FLO |
| 0.540000         | 29.40               | 10.1         | 46          | 16.6                 | L1         | GND |
| 0.840000         | 23.80               | 10.1         | 46          | 22.2                 | N          | FLO |
| 0.895000         | 29.80               | 10.1         | 46          | 16.2                 | N          | FLO |
| 1.435000         | 20.10               | 10.2         | 46          | 25.9                 | L1         | GND |
| 1.855000         | 25.20               | 10.1         | 46          | 20.8                 | N          | FLO |



**MEASUREMENT RESULT: "HY14\_2C\_fin QP"**

8/8/05 16:01

| Frequency<br>MHz | Level<br>dB $\mu$ V | Transd<br>dB | Limit<br>dB $\mu$ V | Margin<br>dB | Line | PE  |
|------------------|---------------------|--------------|---------------------|--------------|------|-----|
| 0.480000         | 52.20               | 10.1         | 56                  | 4.1          | L1   | GND |
| 0.540000         | 46.00               | 10.1         | 56                  | 10.0         | N    | GND |
| 0.835000         | 51.30               | 10.1         | 56                  | 4.7          | L1   | GND |
| 1.135000         | 50.80               | 10.2         | 56                  | 5.3          | L1   | GND |
| 1.195000         | 50.80               | 10.1         | 56                  | 5.2          | L1   | GND |
| 1.555000         | 49.50               | 10.2         | 56                  | 6.5          | L1   | GND |

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**MEASUREMENT RESULT: "HY14\_2C\_fin AV"**

8/8/05 16:01

| Frequency<br>MHz | Level<br>dB $\mu$ V | Transd<br>dB | Limit<br>dB $\mu$ V | Margin<br>dB | Line | PE  |
|------------------|---------------------|--------------|---------------------|--------------|------|-----|
| 0.420000         | 42.70               | 10.1         | 47                  | 4.7          | L1   | GND |
| 0.475000         | 42.70               | 10.1         | 46                  | 3.8          | L1   | GND |
| 1.075000         | 38.40               | 10.1         | 46                  | 7.6          | L1   | FLO |
| 1.135000         | 42.10               | 10.2         | 46                  | 4.0          | L1   | GND |
| 1.195000         | 41.90               | 10.1         | 46                  | 4.1          | L1   | GND |
| 1.555000         | 39.70               | 10.2         | 46                  | 6.3          | L1   | GND |

ANNEX B PHOTOGRAPH OF EUT

External Photo



Mobile Phone



Mobile Phone



Mobile Phone



Mobile phone



Charger (AC/DC Adapter)



Charger (AC/DC Adapter)

Internal Photo

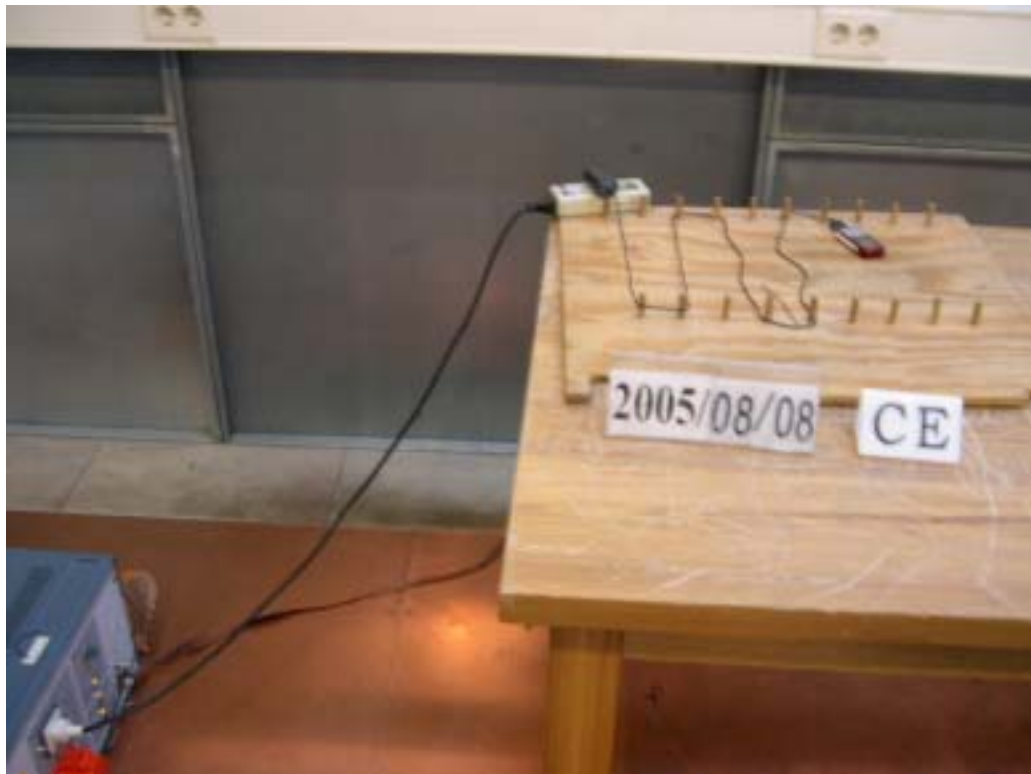


Mobile phone Disassembly



mobile phone PCB front view

ANNEX C TEST LAYOUT



Pic1 Conducted Emission



Pic2 Radiated Spurious Emission

\*\*\*END OF REPORT BODY\*\*\*