NOKIA

September 7, 2004

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
12th Street Lobby, TW-A325
Washington, D.C. 20554

Re: ***Ex Parte* Presentation**
Sunshine Exception Based Upon OET Request For Additional Information on Nokia Testing (47 C.F.R. § 1.1204(a)(10))
ET Docket No. 00-258

Dear Ms. Dortch:

As noticed in Sprint's September 1, 2004, *ex parte* letter, on August 31, 2004, Nokia Inc. ("Nokia") and Sprint Corporation ("Sprint") personnel met with Office of Engineering and Technology ("OET") and Wireless Telecommunications Bureau personnel to discuss "overload" interference tests recently performed by Nokia with respect to a mobile wireless service operating in the spectrum located at 1915-1920 MHz and 1995-2000 MHz (the "H Block"). During that meeting, OET personnel requested additional information regarding the Nokia testing performed.

Because this information was expressly requested by OET to clarify evidence in the record, it is being submitted pursuant to Section 1.1204(a)(10) of the Commission's rules.

1. Test Procedure.

Nokia followed the Overload Test procedures (only) set forth in the Test Plan attached as Appendix A, except that: (i) only a CDMA interferer waveform was tested; and (ii) intermodulation response was not tested. All tests used laboratory power supplies in place of battery chargers. The CDMA signal generator source was characterized for its noise floor at several power output points up to its failing limit. Calls and Frame Error Rate ("FER") measurements were made using a CDMA Wireless Communications Test Set by Agilent (8960 Series 10; E5515C). We note that the September 1 *ex parte* filing inadvertently listed an Agilent 89441A in the overload test setup diagram as the base station simulator, whereas the base station simulator used was an Agilent 8960.

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A. FER Measurements:

The call box FER settings are as follows:

- Confidence Level = 0ff, Max frames = 5000, leave others as default.
- Increase the H-interferer from -100 dBm/1.23MHz until the 2% FER starts appearing. Watch the FER value and record its value when number of frames reaches or exceeds 1000. Do this 5 times, take the average and record that value as the official FER for that H-interferer level setting.
- Note that there may be more volatility in the FER number as the number increases above 15 to 20%. If necessary, take the average of 10 measurements. The number of averages can be decreased if the same value of FER is measured in the first 3 measurement iterations.
- Continue by increasing the interferer power in 1 dB increments and repeating the measurements.

B. Call Drop:

The call drop point is affected by the Call Box Drop Timer setting. The setting is such that a call will be dropped only if the Call Box receives, on the reverse link, a count of 250 consecutive bad frames. It only takes 1 good frame to reset the count to 0. The setting is not adjustable. Therefore, even with a FER of near 100%, only 4 good frames are needed to reach 1000 frames (about 20 seconds), and maintain the call. Note that just because a call is maintained, this does not mean that the voice/data quality level is met. This is for laboratory functionality only, in the field this is controlled by the carrier base station.

2. Spectrum Analyzer Plot.

Attached hereto as Appendix B is a spectrum analyzer plot of the tunable H-Block bandpass filter response, which shows the filter's rejection at the PCS A-Block RX channel 25 at 1930 MHz. This is a required element to the Overload Test procedure and must be included in any setup to confirm Nokia’s findings. The H-Block bandpass filter must be placed after the CDMA generator for these tests to have validity.

3. Duplexer Test Data.

The duplexer testing was performed in-house by Nokia as part of its regular testing process to qualify filter vendors for its CDMA products. The test data depicted in the graphs represents duplexers from various manufacturers. These duplexers are designed to meet IS 98 requirements. The RX attenuation curves were based on Nokia test results. The duplexers were soldered to test fixtures supplied by the manufacturer, placed inside a temperature chamber and connected to a Network Analyzer. The

Network Analyzer measures the duplexer's electrical response as the temperature is varied from -30C to 25C to 85C. The manufacturer guarantees the filter's electrical performance over this temperature range.

4. Description of Test Handsets.

Nokia performed tests on a number of Personal Communications Services ("PCS") handset models to examine the susceptibility of PCS handsets to "overload" interference. The seven handsets tested were composed of five models in commercial deployment and two engineering prototypes of a sixth model being used on a beta basis by Nokia personnel in preparation for expected commercial production in 2005. Handsets from three manufacturers were chosen. All of the handsets models were chosen at random – none were pre-selected for any performance purpose.

As required by Sections 1.1204(a)(10) and 1.1206(b) of the Commission's Rules, this letter is being electronically filed with your office. If you have any questions concerning this submission, please contact the undersigned.

Sincerely,

/s/ Cecily Cohen____________
Director for Government & Industry Affairs

Attachments
cc:

Bryan Tramont
Cheryl Wilkerson
Jennifer Manner
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Sam Feder
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John Muleta
Ed Thomas
Bruce Franca
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Nese Guendelsberger
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Ron Chase
Jay Jackson
Salomon Satche
Priya Shrinivasan
Uzoma Onyeije
Jim Schlichting
Jamison Prime
Tom Derenge

APPENDIX A

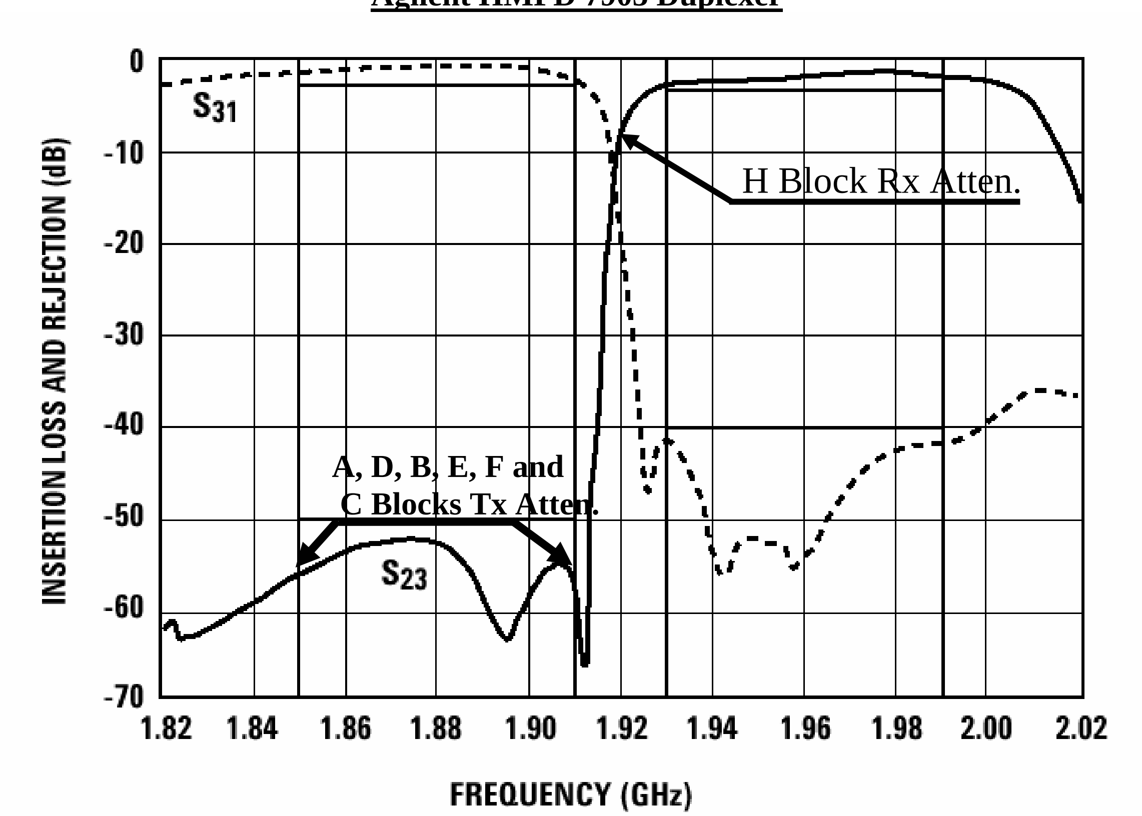
Test Plan
For the
Feasibility of a PCS H Block
Revision 7, 2004 0831

Overview of Testing

This defines tests to detect mobile-to-mobile interference related to the proposed H-Block, and its location within the existing transmit-receive frequency duplex separation of the PCS band.

In the mobile FBAR duplexer filter diagram below it can be observed that transmissions on the A, D, B, E, F, and C Blocks are attenuated by 50 dB or more while the H block at 1915 - 1920 MHz is located on the “skirt” of the filter and appears to provide as little as 8 dB at 1920 MHz.

Agilent HMPD 7905 Duplexer



3 types of tests are to be performed to detect these effects:

1. Receiver Overload Test Measure the threshold and extent of susceptibility of various mobiles receiving a PCS band signal to 'receiver overload' due to a strong signal from a nearby mobile transmitting at high power at the high end of the H block. Tests are to be performed where the victim mobile is operating near its receive sensitivity level, as well as at stronger receive levels. Test should be run with various interferer modulation types, such as CW, iDEN, CDMA and GSM as available. Also demonstrate that a mobile transmitting in the upper C-Block, e. g. 1910 MHz, under similar conditions, does not overload another victim mobile. Also test for an H-Block mobile transmission that would produce 2f1-f2 inter-modulation effects on a PCS B-Block PCS victim channel. For example, a CDMA mobile receives on PCS channel 560 (1958 MHz), and transmits at 1878 MHz, with a nearby H-Block mobile transmitting at 1918 MHz, 2 * 1918 –1878 = 1958.

2. Desensitization from AWGN Test Measure the amount of Additive White Gaussian Noise (AWGN) interference that causes excessive FER or BER for various receive levels. This AWGN interference simulates what might result from OOBE emissions from another mobile operating nearby.

3. Out-of-Band Emissions Test Measure the OOBE of a number of typical PCS mobiles, in dBm/MHz, falling within the lower mobile receive channels (e.g., CDMA channel 25 = 1931.25 MHz), while transmitting on a call on various channels in the PCS band (A-F blocks).

General Testing Guidelines

- Tests are to be performed on a sampling of mobile models operating on existing PCS networks, including CDMA, GSM, and TDMA types.
- Tests are to be performed with a cabled connection to the mobile Antenna Connector. Antenna gain with respect to the Antenna Connector should be specified. (Typical peaks of 0 to +1 dBi have been measured by the CTIA Certified Antenna testing labs).
- Interference effects measured with these cabled connections can be translated to over-the-air coupling using mobile antenna gain (typically 0 to 1 dBi) and free space attenuation due to distance separation between the interferer and victim (e. g. 38 dB for 1 meter at 1900 MHz).
- Tests should be performed at ambient room temperatures and if possible, other normal mobile operating temperatures.
- Kits for mobiles to be tested should include a battery charger, RF-Test-Cable (labeled with its RF loss), and a listing of a valid acquisition channel (e.g., channel and SID in the mobile Preferred Roaming List).
- For overload test interference tests, the interfering signal generator must be capable of supporting an extremely low broadband noise level. Typically, this calls for a generator (and external filter, if any) measured for spurious emissions to be less than the victim receive power, e. g. less than -100 dBm/MHz for a CDMA victim mobile operating just above its receive sensitivity level. The use

of such a generator will ensure that any observed impairments caused by the presence of an H-band signal are due to the fundamental and are not attributable to an overall rise in the noise floor.

Test Procedures

1. Receiver Overload Test

Put up a call between the mobile and the Base Station simulator (BS) on the lowest valid A-Block channel, and adjust the mobile receive power level close to the mobile receiver sensitivity level. Add sufficient AWGN to produce a small operating FER or BER. For example, CDMA mobile sensitivity level is defined in TIA-98 test 3.5.1 as less than .5% Frame Error Rate (FER) when receiving at -104 dBm, full rate frames, Ec/Ior = -15.6 dB (this represents a fully loaded CDMA cell), at service option SO55, 9600 bps. For this test, set the CDMA mobile receive power to -100 dBm, and inject a low level of AWGN to produce .5 – 1% FER. For GSM, use 2% Bit-Error-Rate (BER). With the call operating normally, inject an overload interfering signal at a high H-Block channel (e.g., a CDMA interferer with center at 1918.75 MHz). Note the threshold of increase in FER or BER. Increase the interferer power until the call drops, recording the FER or BER for each increment in interferer power. Repeat the test for other victim mobile receive powers, interferer frequencies, and interferer modulation types. Include a test with a normal C-Block mobile transmission as the interferer. Repeat the test for a B-Block receive band victim, resulting from the inter-modulation 2f1-f2 scenario described in the overview.

2. Desensitization from AWGN Test

Use the same test setup as in the previous test, but use an AWGN generator operating at a much lower power within the mobile receive channel as the interferer. With a call operating normally near its receive sensitivity limit, inject a low level of AWGN, and note the threshold of increase in FER or BER. Increase the AWGN power until the call drops, recording the FER or BER for each increment in AWGN power. Perform the test for other victim mobile receive powers.

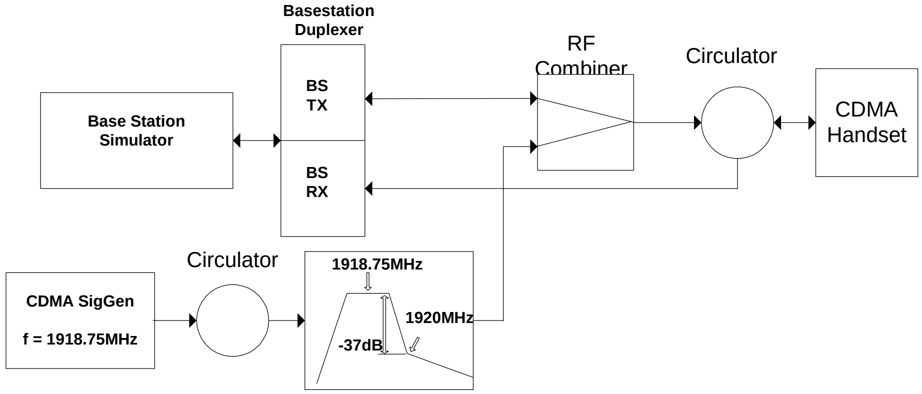
3. Out-of-Band Emissions (OOBE) Test

Measure the OOBE in dBm/MHz, in the range of 1930-1932 MHz from a number of typical handsets transmitting at 1908.75 – 1910 MHz (C Block). The mobiles shall also be tested while transmitting in the A-Block, and also in the D, B, E, and F Blocks if possible. Measure mobile emissions at the maximum mobile transmit power and at a transmit power 10-15 dB below maximum.

Sample Mobile Receiver Desensitization / Overload Test Setup

The setup below can be used to test the desensitization of a mobile due to interference. Check the power levels with the spectrum analyzer to validate the power levels of the BS and interferer. Isolators may be necessary to prevent reverse power effects on signal generators. Measure and record RF circuit losses BS-MS and I-MS.

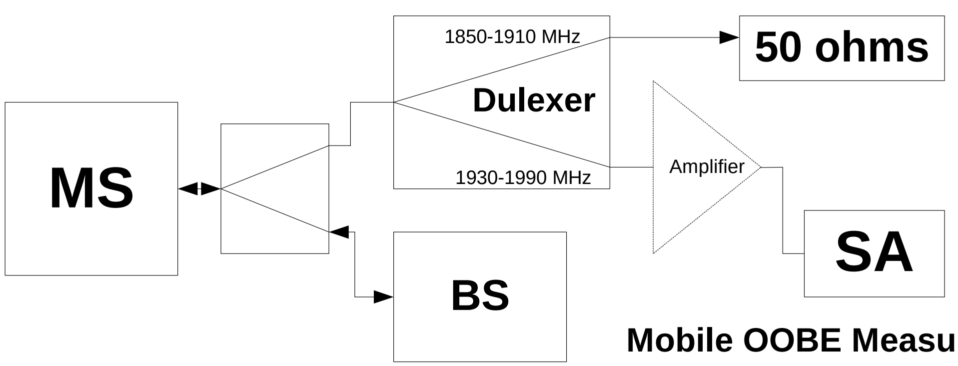
Mobile Receiver Overload Test Setup



Tunable Bandpass Filter
(Tuned to H-Block TX)

Sample Mobile Transmitter Spurious Emissions Test Setup

To avoid overloading the input of the spectrum analyzer for Out-Of-Band-Emissions (OOBE) measurements, where the mobile is transmitting at maximum power in its own band, a common base station duplexer filter can be used to divert most of the in-band power to a 50 ohm load. If necessary, an external preamp can be used to boost the residual spectrum above the noise floor of the spectrum analyzer. Measure and record circuit loss/gain, MS-SA.



Mobile OOBE Measurement

Deliverables for Test Lab

This sheet provides a listing of the guidelines and deliverable data for tests performed by independent labs.

General Instructions

1. Tests are to be performed on a sampling of mobile models operating on existing PCS networks, including CDMA, GSM, and TDMA types. Fill out a data sheet for each mobile tested.

2. RF connections to the mobile are via the Antenna Connector (Mobile-RF-Test-Jack), using the supplied mobile RF-Test-Cable. All mobile measurements and settings are referenced to the Antenna Connector.

3. For CDMA mobiles, the receiver sensitivity measurement procedure is defined in 3GPP2 doc C.S0011 (aka TIA-98), test 3.5.1.

4. Mobiles to be tested shall be accompanied with a battery charger, RF-Test-Cable (labeled with its RF loss), and a listing of a valid acquisition channel (e.g., a CDMA channel and SID in the mobile Preferred Roaming List).

5. Mandatory tests. As a minimum, perform each of these five tests.

- Overload test with CW interferer at upper H-block frequency (e. g. 1918.75 MHz) , mobile on a call on lowest A-block channel (e. g. CDMA ch 25)
- Overload test with CW interferer at upper C-Block frequency (e. g. 1908.75 MHz) , mobile on a call on lowest A-block channel (e. g. CDMA ch 25)
- Overload IMD test where mobile receives on PCS channel 560 (1958 MHz), and transmits at 1878 MHz, with a nearby H-Block mobile transmitting at 1918 MHz, 2 * 1918 –1878 = 1958.
- AWGN test with mobile operating on a A-Block channel

(Note: for each of the above receiver susceptibility tests, the mobile shall be tested while receiving Base Station signal power down near the mobile sensitivity limit, and also at 10 dB above the sensitivity limit.)

- Transmitter Spurious emissions while operating on a A-Block channel, tested while transmitting at max power and again while transmitting at a power level 10-15 dB below max power.

Test Report

For each mobile tested, provide a test report with the following information as a minimum.

Test Setup Ilustration

The test report shall illustrate the cabled test setup used, with RF circuit losses among devices under test and test instruments.

1 Mobile Data

1. Mobile Make and Model Number ______
2. Mobile radio type ____ (CDMA, GSM, TDMA)
3. RF-Test-Cable loss _____ dB (typically 1 dB)
4. Mobile ambient temperature _____

2 Receiver Susceptibility Test Data

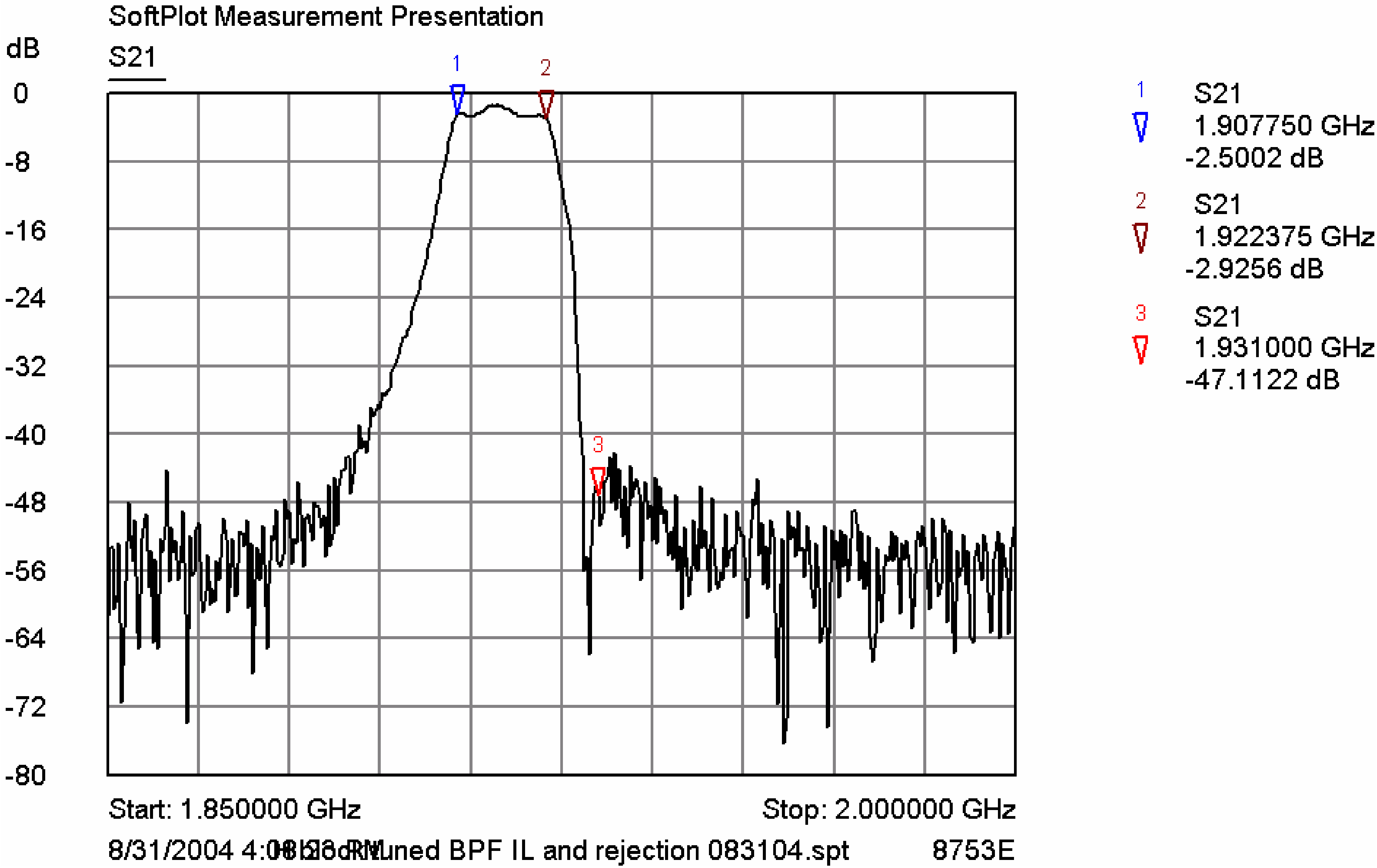
In the test report, provide these entries for each overload or AWGN interference test performed.

1. Interference Generator signal type ___ (e. g. CDMA, GSM, CW, AWGN, other)
2. Interference Generator center frequency ___ (e. g. 1918.75 MHz)
3. Mobile RX/TX channel and frequency ____ (e. g. PCS 25, 1871.25/1931.25 MHz)
4. Base Station signal power received by mobile ___ dBm (e. g. -100 dBm)
5. Table/graph of Interference power level and corresponding FER/BER, and notation of dropped call if applicable.

3 Transmitter Spurious Emissions

1. Mobile RX/TX channel and frequency ____ (e. g. PCS 25, 1871.25/1931.25 MHz)
2. Mobile average transmitter power ___ dBm (e. g. +23 dBm)
3. Table/graph of maximum spurious emissions power (average per 1/MHz) and corresponding range of frequencies scanned _____ (e. g. less than -80 dBm, 1930 – 1960 MHz)

APPENDIX B


SoftPlot Measurement Presentation
dB
S21
0
-8
-16
-24
-32
-40
-48
-56
-64
-72
-80
1
2
3
1 S21 1.907750 GHz -2.5002 dB
2 S21 1.922375 GHz -2.9256 dB
3 S21 1.931000 GHz -47.1122 dB
Start: 1.850000 GHz
Stop: 2.000000 GHz
8/31/2004
BPF IL and rejection 083104.spt
8753E