Application Note

Ultra-High-Speed ACLR Measurement

MS2690A/MS2691A/MS2692A
Signal Analyzer

MS269xA Signal Analyzer
Application Note

Ultra-High-Speed ACLR Measurement

Averaging is a common technique for obtaining stable measurement results when measuring ACLR or OBW using a spectrum analyzer. However, a spectrum analyzer requires more time to perform measurement because it must sweep for the number of averaging times. [Slide 2 Ex. 1]

By contrast, a signal analyzer performs high-speed measurement by capturing the whole set of in-band data. [Slide 2 Ex. 2]

In addition, a signal analyzer performs ultra-high-speed measurement by capturing data for a measuring time that is equivalent to the averaging times, eliminating the need for averaging. [Slide 2 Ex. 3]

Spectrum Analyzer

Ex. 1

SPAN 25 MHz
RBW 30 kHz
SWT 95 ms

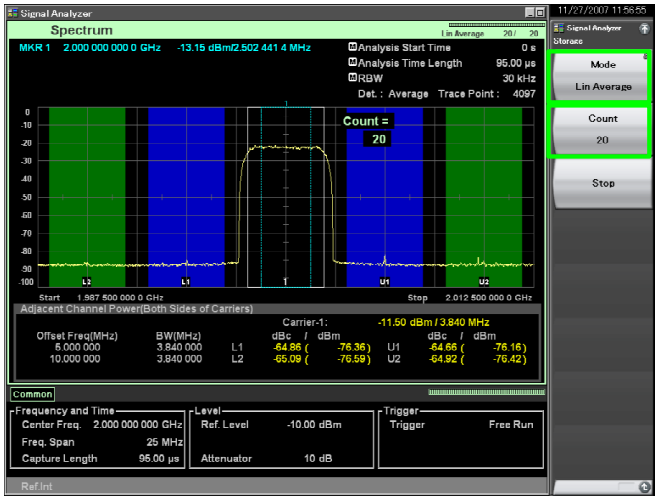
20 Averaging times

Measurement time **2.6 s**

Signal Analyzer

Ex. 2

SPAN 25 MHz
RBW 30 kHz
Analysis Length 95 µs

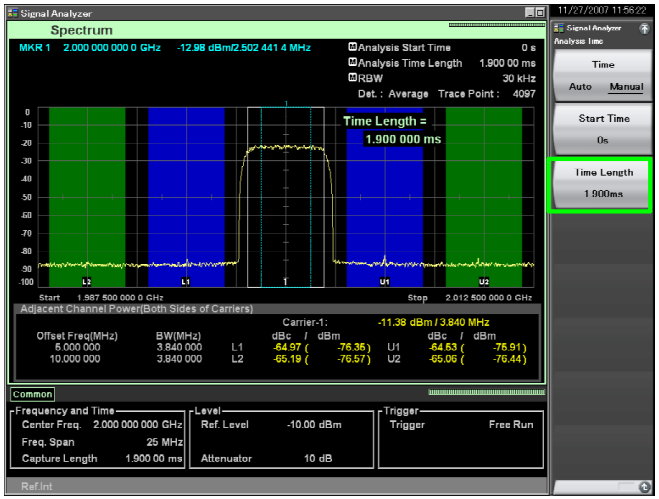


20 Averaging times

Measurement time **0.3 s**

Ex. 3

SPAN 25 MHz
RBW 30 kHz
Analysis Length 1900 µs



20 Averaging times → Batch Capture **20 times**

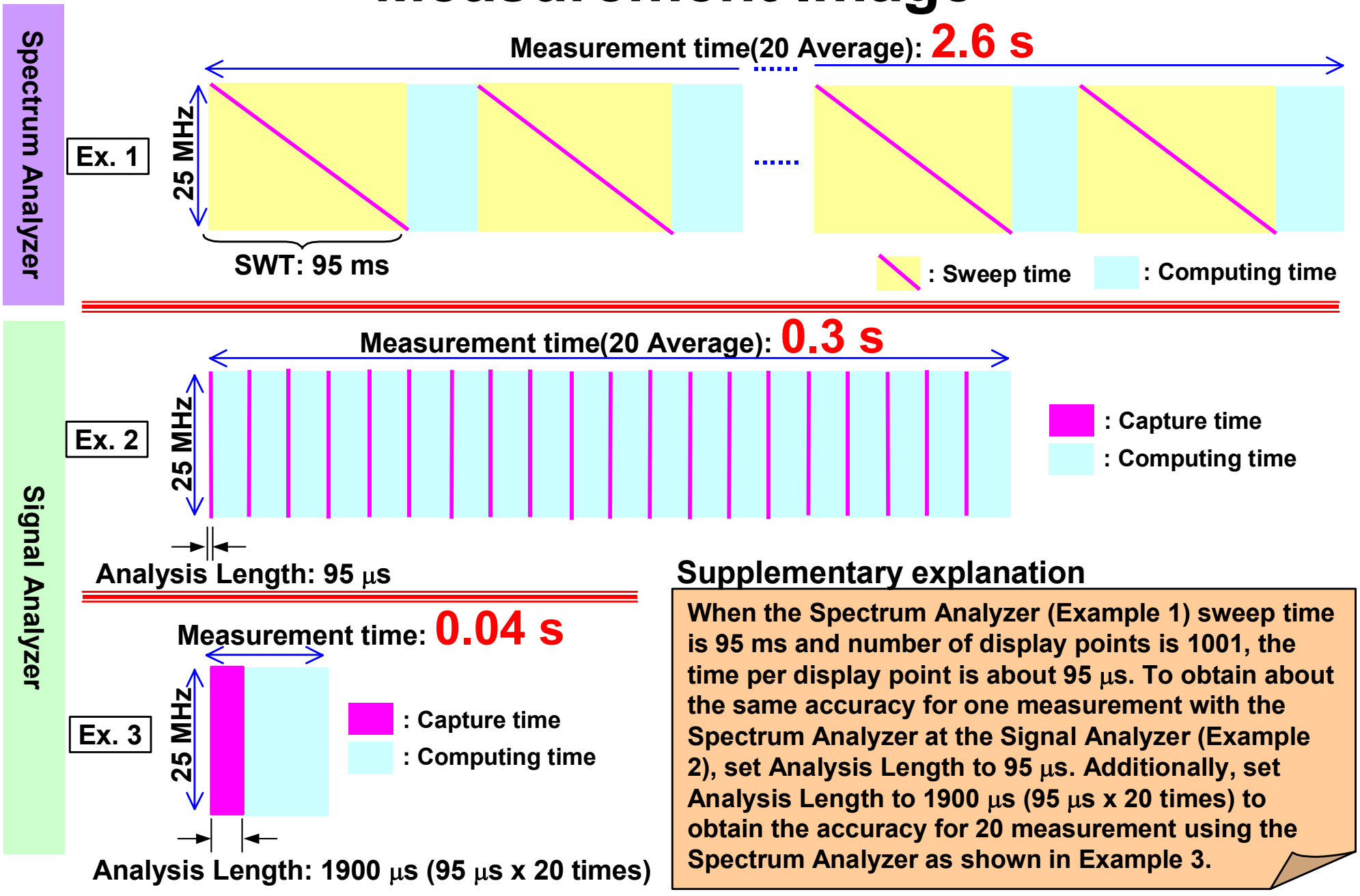
Measurement time **0.04 s**

8x faster
High speed

65x faster
Ultra-high-speed

* The above measurement time is calculated from the time required for 1000 measurements.

Measurement Image

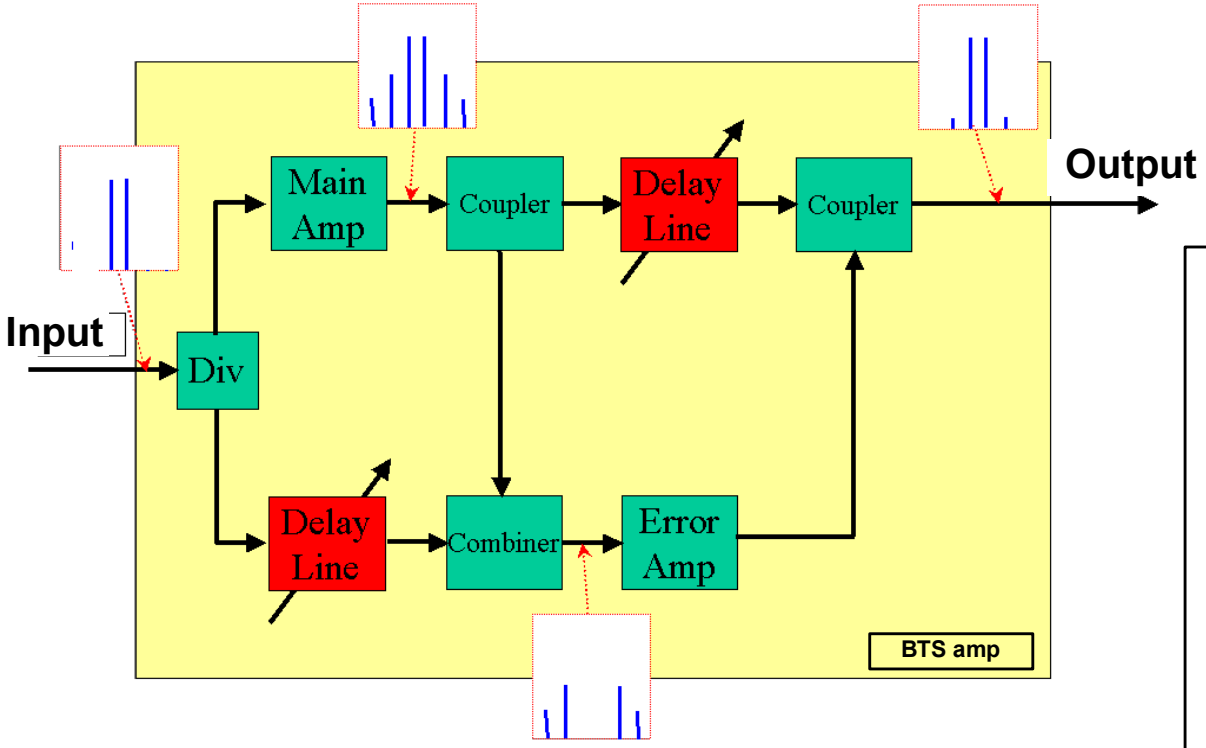


Supplementary explanation

When the Spectrum Analyzer (Example 1) sweep time is 95 ms and number of display points is 1001, the time per display point is about 95 μs. To obtain about the same accuracy for one measurement with the Spectrum Analyzer at the Signal Analyzer (Example 2), set Analysis Length to 95 μs. Additionally, set Analysis Length to 1900 μs (95 μs x 20 times) to obtain the accuracy for 20 measurement using the Spectrum Analyzer as shown in Example 3.

Advantage of Ultra-High-Speed ACLR Measurement

Amplifier adjustment is repetitive work (adjustment ↔ confirmation) requiring confirmation of various performance items, such as the distortion compensation circuit, current adjustment, frequency characteristics, etc. Therefore, ACLR adjustment requires a lot of time.

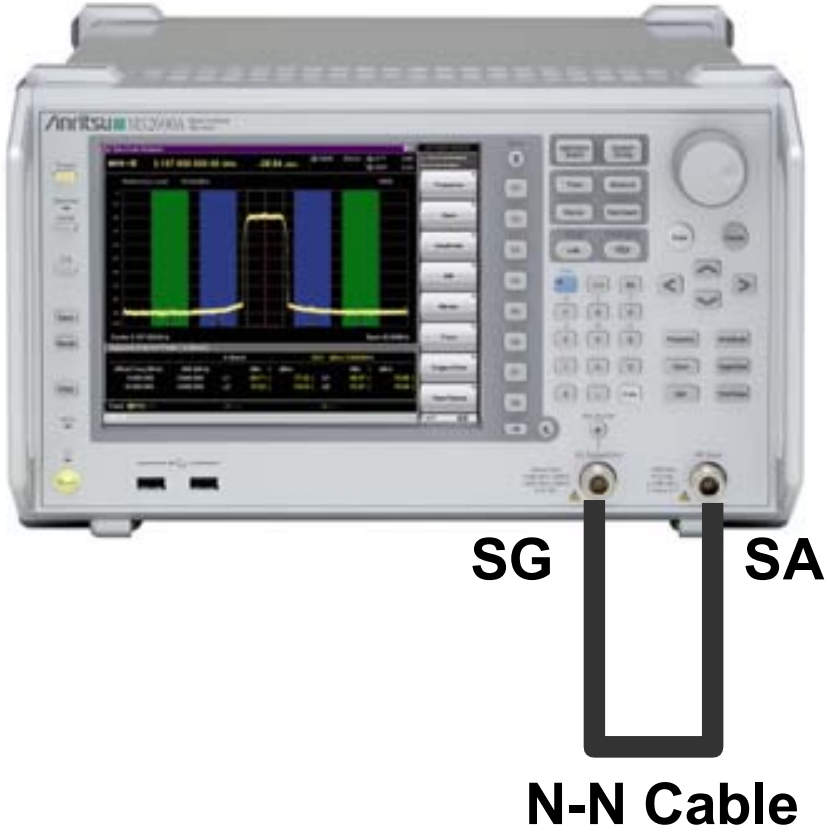


Example of distortion compensation
(Feed forward circuit)

In particular, amplifiers for base stations requiring high performance require several performance adjustments.

If 10 adjustments are made, the work time is reduced 10 fold.

Operation Example



Sample situation

[Frequency] > “2 GHz”
[Amplitude] > “–10 dBm”

[Pattern]

Package: W-CDMA (BS Tx test)
Pattern: Test Model_1_16DPCH

Signal Generator Settings

Switching to Signal Generator

[Application Switch] > [F3: Signal Generator]

Presetting All Function

[Preset] > [F5: Preset All Application]

Setting Waveform Pattern

[F4: Load Pattern]

Package: W-CDMA (BS Tx test)

Pattern: Test Model_1_16DPCH

[F3: Select Pattern]

Package: W-CDMA (BS Tx test)

Pattern: Test Model_1_16DPCH

Basic Settings

[Frequency] > “2 GHz”

[Amplitude] > “–10 dBm”

㊠ Menu > [F7: Modulation] > “On”

[F8: SG Output] > “On”

Spectrum Analyzer Settings (20 Averaging Times)

Switching to Spectrum Analyzer

[Application Switch] > [F1: Spectrum Analyzer]

Basic Settings

[Frequency] > "2 GHz"
[Span] > "25 MHz"
[BW] > "30 kHz"
[Amplitude] > "–10 dBm"

[Amplitude] > [F3: Attenuator] > "4 dB"
[Trigger/Gate] > [F1: "Off"]
[Time/Sweep] > [F1: "Auto"]
[Time/Sweep] > [F4: Trace Points "1001"]

Average Settings

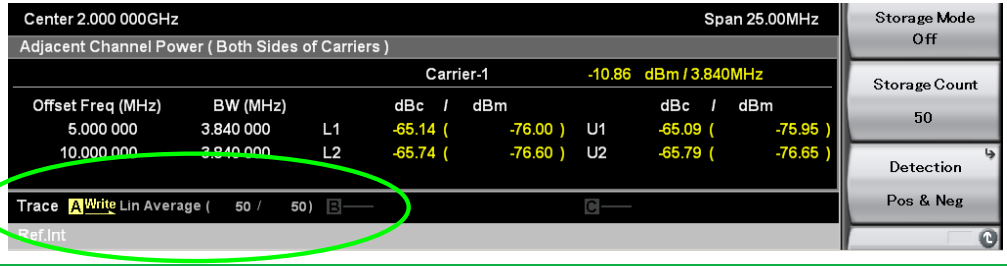
[Trace] > [F4: Trace-A] > [F1: "Lin Average"]
[Trace] > [F7: Storage Count] > "20"

Measure Function (ACP Measurement)

[Measure] > [F8: Standard] > "W-CDMA Downlink"
[Measure] > [F1: ACP]

Repeat Measurement

Continuous



Signal Analyzer Settings (20 Averaging Times)

Switching to Signal Analyzer

[Application Switch] > [F2: Signal Analyzer]

Basic Settings

[Frequency] > “2 GHz”
[Span] > “25 MHz”
[BW] > “30 kHz”
[Amplitude] > “–10 dBm”
[Amplitude] > [F3: Attenuator] > “6 dB”
[Trigger/Gate] > [F1: “Off”]
[Time/Sweep] > [F3: Time Length] > “95 µs”

Average Settings

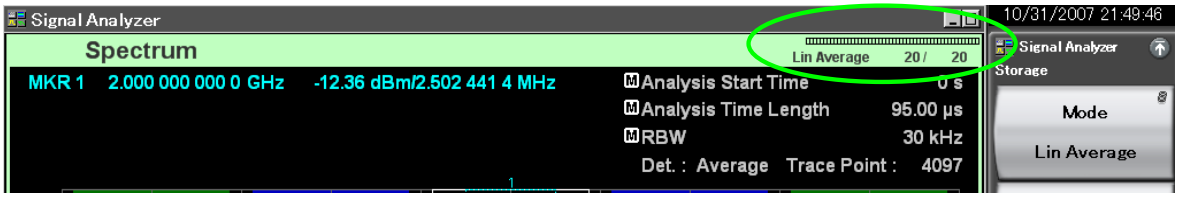
[Trace] > [F4: Storage] > [F1 Mode “Lin Average”]
[F2] > “20”

Measure Function (ACP Measurement)

[Measure] > [F1: ACP]
(F1 ~ F5: default)

Repeat Measurement

Continuous



Signal Analyzer Settings (1900 µs Analysis Time Length)

Switching to Signal Analyzer

[Application Switch] > [F2: Signal Analyzer]

Basic Settings

[Frequency] > “2 GHz”
[Span] > “25 MHz”
[BW] > “30 kHz”
[Amplitude] > “–10 dBm”
[Amplitude] > [F3: Attenuator] > “6 dB”
[Trigger/Gate] > [F1: “Off”]
[Time/Sweep] > [F3: Time Length] > “1900 µs”

Average Settings

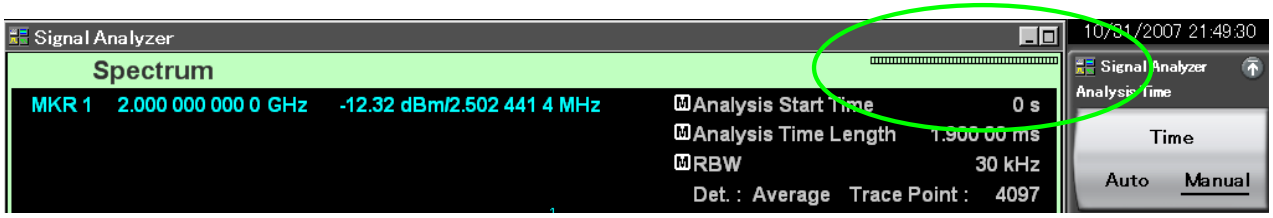
[Trace] > [F4: Storage] > [F1 Mode “Off”]

Measure Function (ACP measurement)

[Measure] > [F1: ACP]
(F1 ~ F5: default)

Repeat Measurement

Continuous



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Specifications are subject to change without notice.

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