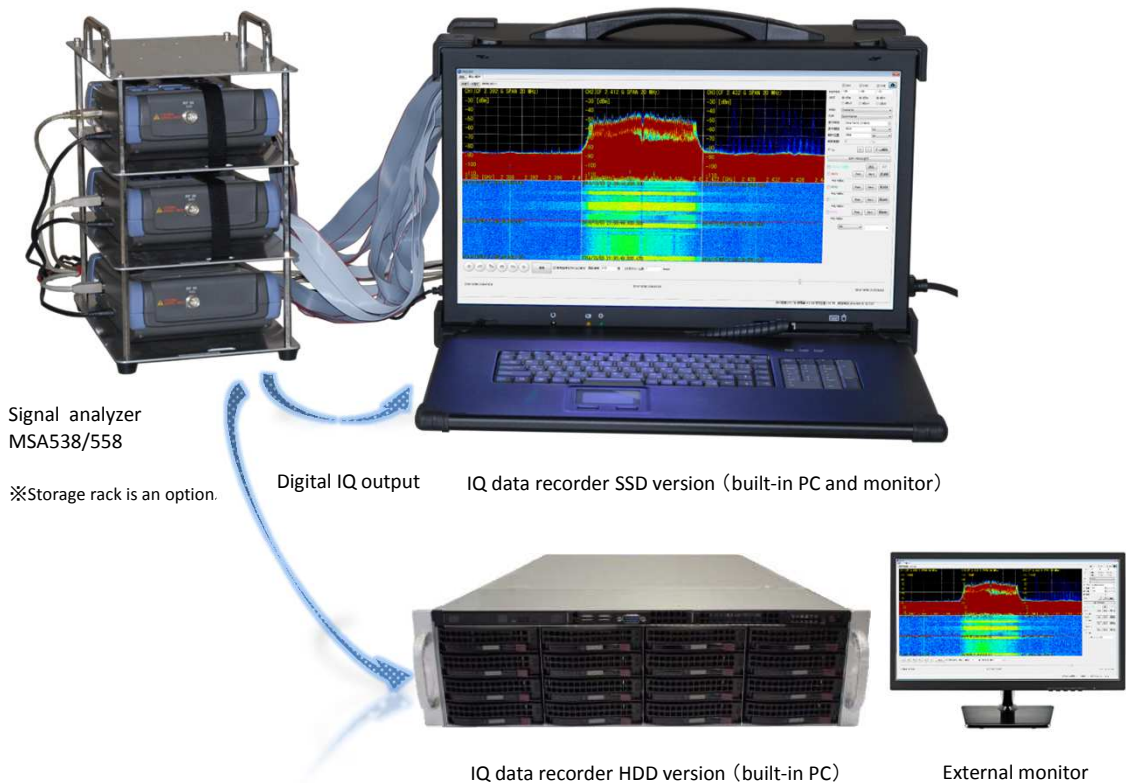# C & U
CREATIVE & UNIQUE

MICROWAVE

MQ5300

The IQ data captured by signal analyzer MSA538/558 are recorded in real time.
This is an ideal system to measure in the maximum 60MHz span, to measure simultaneously different frequency bands, and to record over a long time.

Signal analyzer
MSA538/558

※Storage rack is an option.

Digital IQ output   IQ data recorder SSD version（built-in PC and monitor）

IQ data recorder HDD version（built-in PC）   External monitor
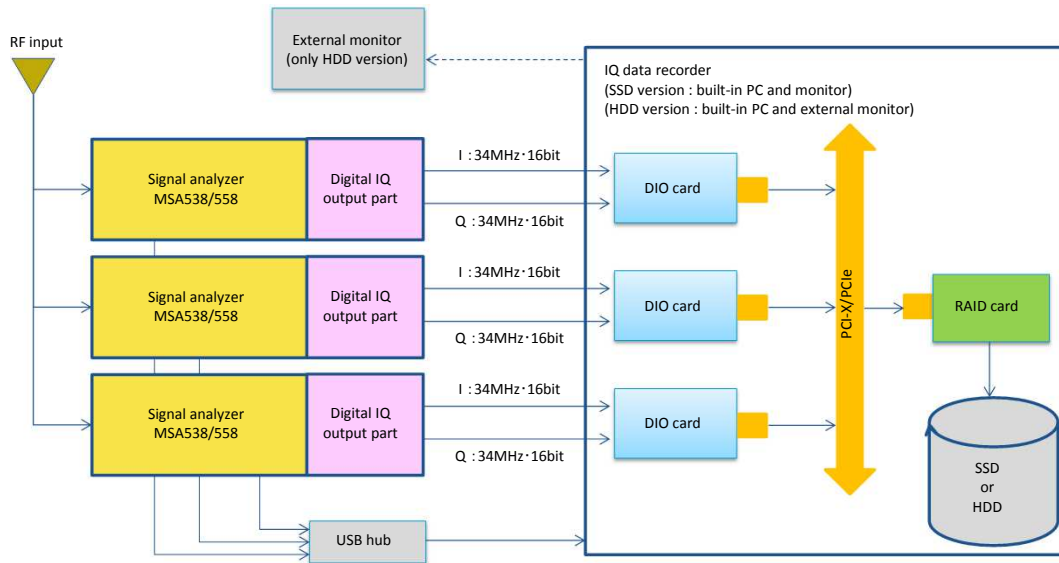

Outline

The real time IQ data recorder system MQ5300 is a total system in which the IQ data captured by a signal analyzer (a real time spectrum analyzer) MSA538/558 are stored at real time in the IQ data recorder, and then the playback and analysis are performed with a basic software MAS550.

Features

● Since the large capacity disk is equipped, **the real time IQ data can be recorded over a long time**.

● Frequency span：**60MHz** maximum　　※ when three units of MSA538/558 are used.

● Even **plural discontinuous and different frequency bands** (ex. two-way communication by FDD) can be measured **simultaneously**.
　　※ when plural units of MSA538/558 are used.

● The spectrum can be displayed at real time **even while recording the IQ data**.

● Frequency range：20kHz to 3.3GHz (MSA538) or 20kHz to **8.5GHz** (MSA558)

● The IQ data recorded can be played back and analyzed easily by using the basic software MAS550.

● This system is **very low price** in spite of the real time measurement and large capacity storage.

◆ System block diagram (3 units of MSA538/558)

RF input

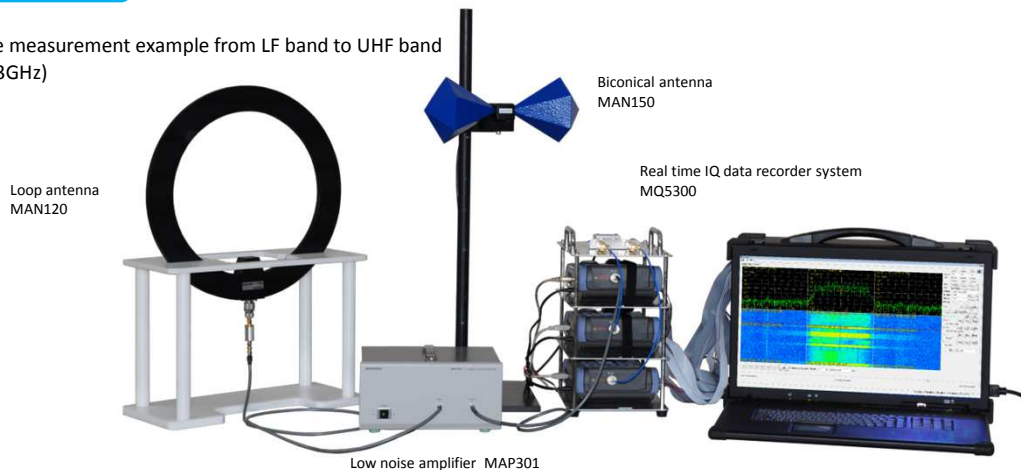External monitor
(only HDD version)

IQ data recorder
(SSD version : built-in PC and monitor)
(HDD version : built-in PC and external monitor)

| Signal analyzer MSA538/558 | Digital IQ output part | I : 34MHz・16bit | DIO card |
| | | Q : 34MHz・16bit | |

| Signal analyzer MSA538/558 | Digital IQ output part | I : 34MHz・16bit | DIO card |
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| Signal analyzer MSA538/558 | Digital IQ output part | I : 34MHz・16bit | DIO card |
| | | Q : 34MHz・16bit | |

PCI-X/PCIe

RAID card

SSD or HDD

USB hub

◆ System specifications overview

| Item	Specifications
■ Signal analyzer MSA538/558	Battery MB400 cannot be installed. Other specifications conform to MSA500 series catalog.
■ Number of setable channels	1 to 3CH
■ Frequency span	1CH : 20kHz to 20MHz 2CH : 20kHz to 40MHz 3CH : 20kHz to 60MHz ※However, in case of time domain analysis of power vs time and frequency vs time, span is 20MHz max even if number of channels is two or three.
■ Sampling time and frame time vs frequency span	[Frequency span]　[Sampling time]　[Frame time] 20MHz　　　　　29.41ns　　　　　30.12us 10MHz　　　　　58.82ns　　　　　60.24us 5MHz　　　　　117.7ns　　　　　120.5us 2MHz　　　　　294.1ns　　　　　301.2us 1MHz　　　　　588.2ns　　　　　602.4us 500kHz　　　　1.177us　　　　　1.205ms 200kHz　　　　2.941us　　　　　3.012ms 100kHz　　　　5.882us　　　　　6.024ms 50kHz　　　　11.77us　　　　　12.05ms 20kHz　　　　29.41us　　　　　30.12ms
■ IQ data recorder SSD version	Disk capacity : 2.88 to 8.64TB Dimensions : 524(W) × 347(H) × 226(D) mm　※excluding projections PC : built-in Monitor : built-in, 21.5 inch Power supply : 100 to 240VAC, 500W Weight : approx. 20kg
■ IQ data recorder HDD version	Disk capacity : 8 to 32TB Dimensions : 437(W) × 132(H) × 648(D) mm　※excluding projections PC : built-in Monitor : External, 21.5 inch Power supply : 100 to 240VAC, 800W Weight : approx. 35kg

◆ Radio wave measurement example from LF band to UHF band
   (50kHz to 3GHz)

Biconical antenna
MAN150

Real time IQ data recorder system
MQ5300

Loop antenna
MAN120

Low noise amplifier MAP301

【Recording screen】
Basic setup for MSA538/558, threshold setup and recording start/stop conditions setup are made.
The lump-sum or individual setting up to three units of MSA538/558 is possible.
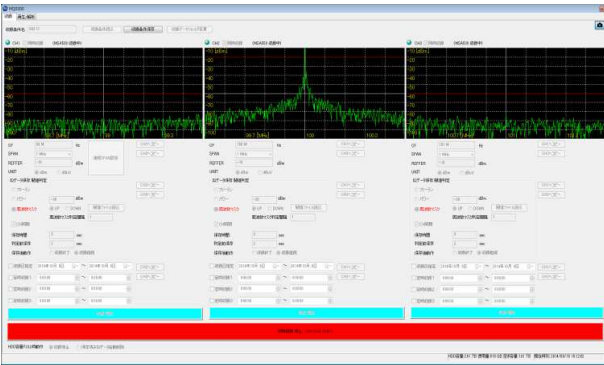
● Main functions
・Lump-sum or individual setting of the measurement conditions (MSA538/558)
・Threshold setting (for frequency mask and UP / DOWN judgement)
・Setting of record time
・Start / stop of simultaneous or individual record

【Playback / analysis screen】
It is possible to play back and analyze the waveform of specified range after displaying the spectrogram of recorded IQ data.
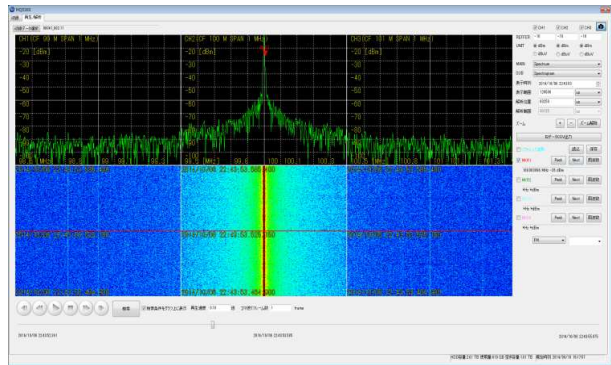

● Main functions
・Waveform display : Selectable from the four kinds below
　　　Spectrum, OverWrite, Power vs time, Frequency vs time
・Voice demodulation of AM and FM signals
・CSV output of IQ data
・Signal search function : Specified by threshold and time

Measurement examples
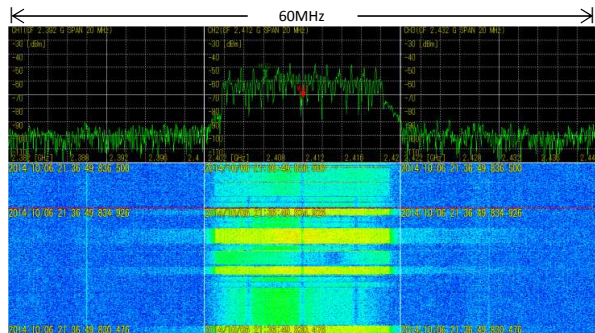
Example 1. **Measurements up to maximum 60MHz span**

● Such as measurement of interference that a carrier frequency gives and receives

・The hopping and burst signals occurring rarely can be captured exactly.
・The frequency of occurrence of the signal can be known.
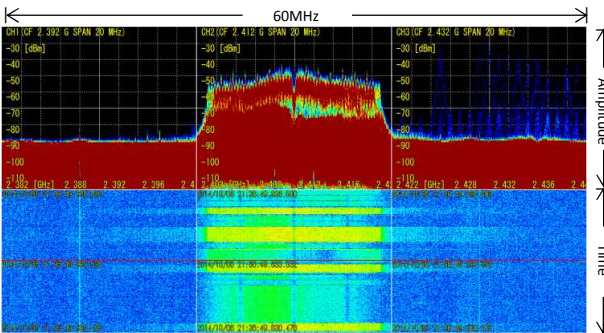
Upper : OverWrite　　Lower : Spectrogram

Example 3. **Simultaneous measurement of different frequency bands**

● Such as measurement of two-way communication in wireless system
・Such different frequency bands as FDD system can be recorded simultaneously. (maximum 20MHz span/CH)
・Enables applications to stationary measurement and mobile measurement of the electric field strength, regarding LTE and ETC/DSRC.

Upper : Spectrum　　Lower : Spectrogram

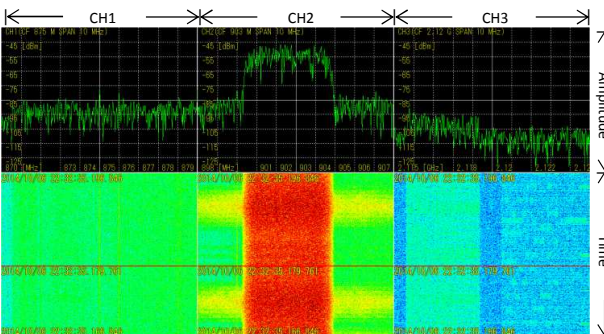Example 2. **Recording real time IQ data over a long time**

● Such as measurement of DFS function of 5GHz band wireless equipment

・Enables measurement at the maximum 60MHz span.
・The weather radar signal can be captured because frame time is so fast as maximum 30us/frame.
・The transition of frequency can be monitored.

Upper : Spectrum　　Lower : Spectrogram

Example 4. **Displaying spectrum at real time during recording IQ data**

● Such as illegal radio wave monitoring and site survey

・The spectrum can be immediately checked on the spot.
・Such time domain analysis as power vs time and frequency vs time is possible.
・Voice demodulation of AM and FM signals is possible.

Upper : Spectrum　　Lower : Setting menu

◆ MQ5300　SSD version IQ data recorder

Model number	Frequency range	Span	Record time	Capacity	Remarks
MQ5300-538R/1_2.88T	20kHz to 3.3GHz	20MHz	approx. 5 hours	2.88TB	MSA538 × 1 unit
MQ5300-538R/1_5.76T			approx. 10 hours	5.76TB	
MQ5300-538R/1_8.64T			approx. 15 hours	8.64TB	
MQ5300-538R/2_3.84T		40MHz	approx. 3 hours	3.84TB	MSA538 × 2 units
MQ5300-538R/2_5.76T			approx. 5 hours	5.76TB	
MQ5300-538R/2_8.64T			approx. 7.5 hours	8.64TB	
MQ5300-538R/3_5.76T		60MHz	approx. 3 hours	5.76TB	MSA538 × 3 units
MQ5300-538R/3_8.64T			approx. 5 hours	8.64TB	
MQ5300-558R/1_2.88T	20kHz to 8.5GHz	20MHz	approx. 5 hours	2.88TB	MSA558 × 1 unit
MQ5300-558R/1_5.76T			approx. 10 hours	5.76TB	
MQ5300-558R/1_8.64T			approx. 15 hours	8.64TB	
MQ5300-558R/2_3.84T		40MHz	approx. 3 hours	3.84TB	MSA558 × 2 units
MQ5300-558R/2_5.76T			approx. 5 hours	5.76TB	
MQ5300-558R/2_8.64T			approx. 7.5 hours	8.64TB	
MQ5300-558R/3_5.76T		60MHz	approx. 3 hours	5.76TB	MSA558 × 3 units
MQ5300-558R/3_8.64T			approx. 5 hours	8.64TB	

◆ MQ5300　HDD version IQ data recorder

Model number	Frequency range	Span	Record time	Capacity	Remarks
MQ5300-538R/1_8THD	20kHz to 3.3GHz	20MHz	approx. 8 hours	8TB	MSA538 × 1 unit
MQ5300-538R/1_16THD			approx. 16 hours	16TB	
MQ5300-538R/1_32THD			approx. 32 hours	32TB	
MQ5300-538R/2_10THD		40MHz	approx. 5 hours	10TB	MSA538 × 2 units
MQ5300-538R/2_20THD			approx. 10 hours	20TB	
MQ5300-538R/2_32THD			approx. 16 hours	32TB	
MQ5300-538R/3_16THD		60MHz	approx. 5 hours	16TB	MSA538 × 3 units
MQ5300-538R/3_32THD			approx. 10 hours	32TB	
MQ5300-558R/1_8THD	20kHz to 8.5GHz	20MHz	approx. 8 hours	8TB	MSA558 × 1 unit
MQ5300-558R/1_16THD			approx. 16 hours	16TB	
MQ5300-558R/1_32THD			approx. 32 hours	32TB	
MQ5300-558R/2_10THD		40MHz	approx. 5 hours	10TB	MSA558 × 2 units
MQ5300-558R/2_20THD			approx. 10 hours	20TB	
MQ5300-558R/2_32THD			approx. 16 hours	32TB	
MQ5300-558R/3_16THD		60MHz	approx. 5 hours	16TB	MSA558 × 3 units
MQ5300-558R/3_32THD			approx. 10 hours	32TB	

◆ Options

Product name	Model	Remarks
Sleeve antenna	M401	800MHz to 1GHz
	M402	1.25 to 1.65GHz
	M403	1.7 to 2.2GHz
	M404	2.25 to 2.65GHz
	M406	4.8 to 6.2GHz
Stand for M400 antenna	M400-OP01	
Loop antenna	MAN120	50kHz to 33MHz
Stand for MAN120	MAN120-OP01	
Biconical antenna	MAN150	20MHz to 3GHz
Stand for MAN150	MAN150-OP01	

Product name	Model	Remarks
Low noise amplifier	MAP301	100kHz to 500MHz, gain 50dB
	MAP302	20MHz to 3GHz, gain 20dB
Coaxial cable	MCxxx	
MSA538/558 storage rack	MQ5300-OP01	three-stage
19 inch rack for HDD version	MQ5300-OP02	

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