

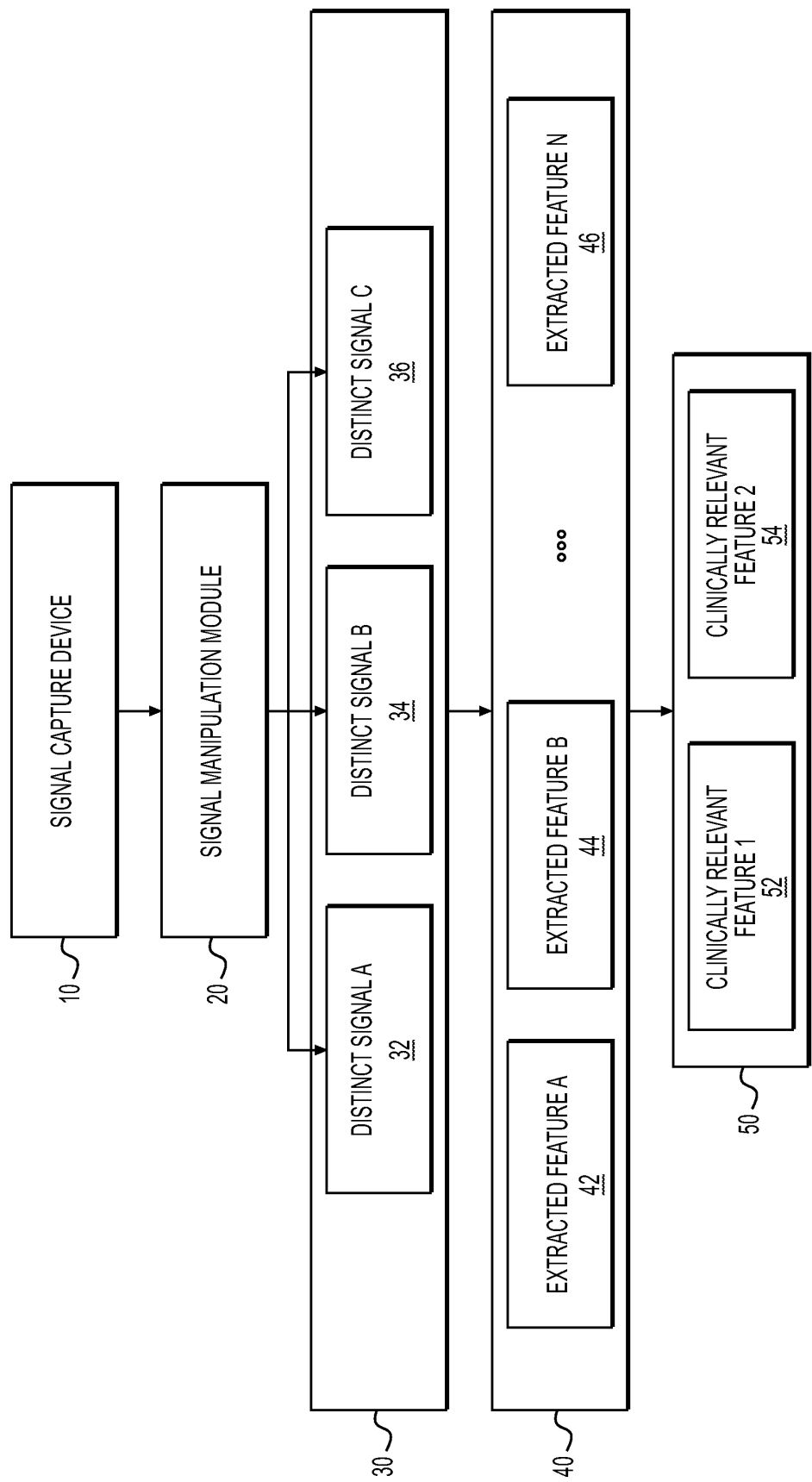


FIG. 1A

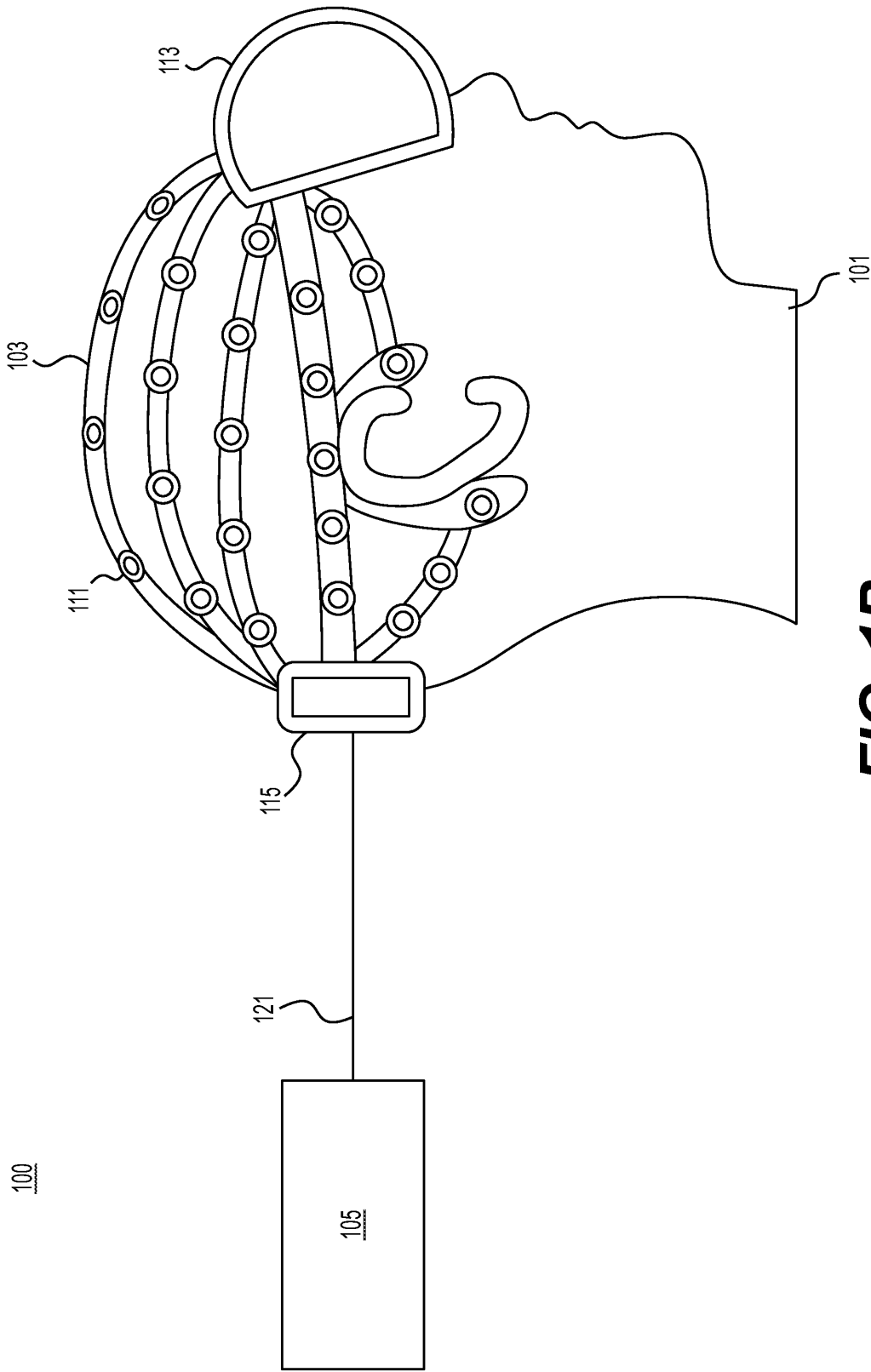


FIG. 1B

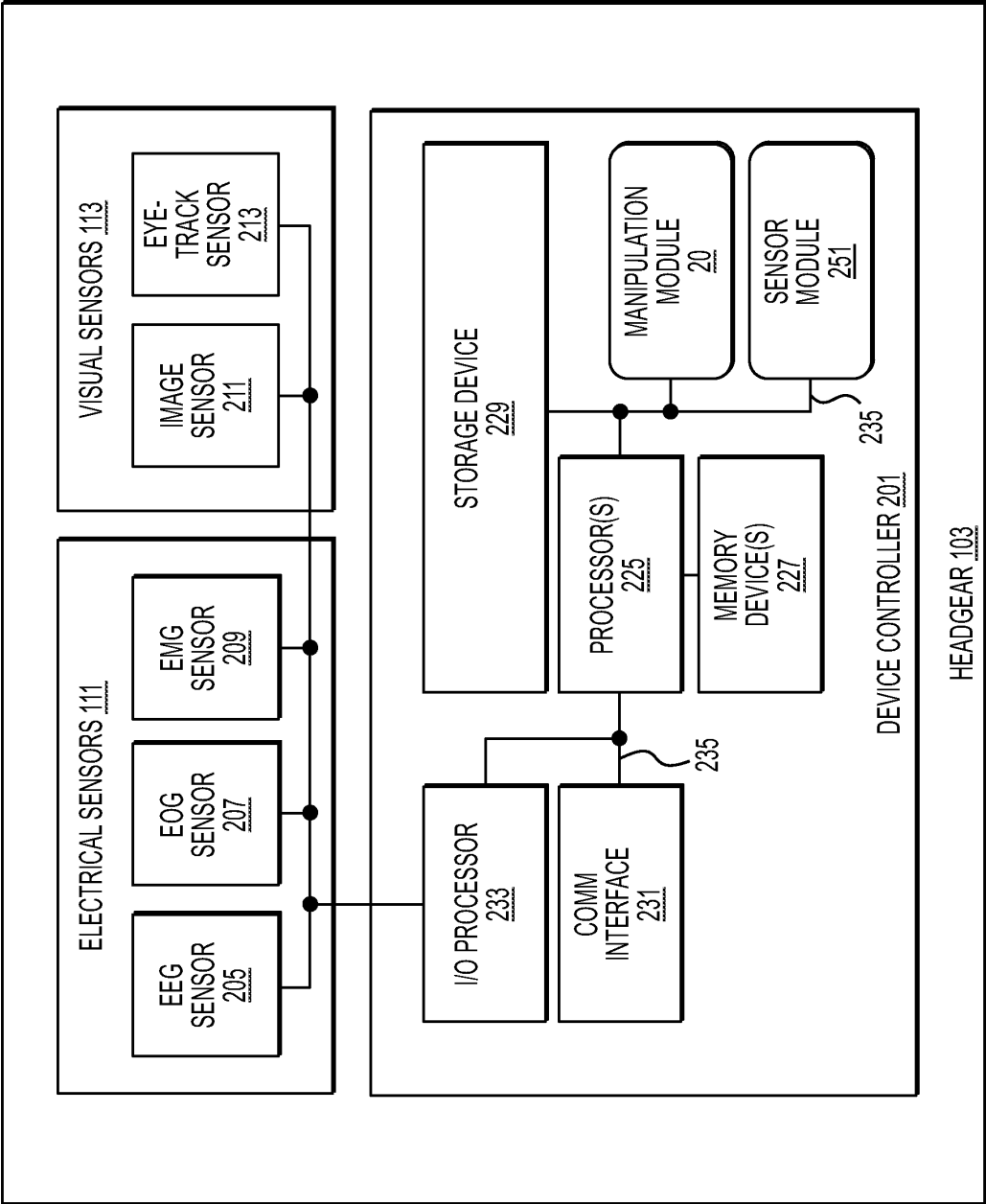


FIG. 2

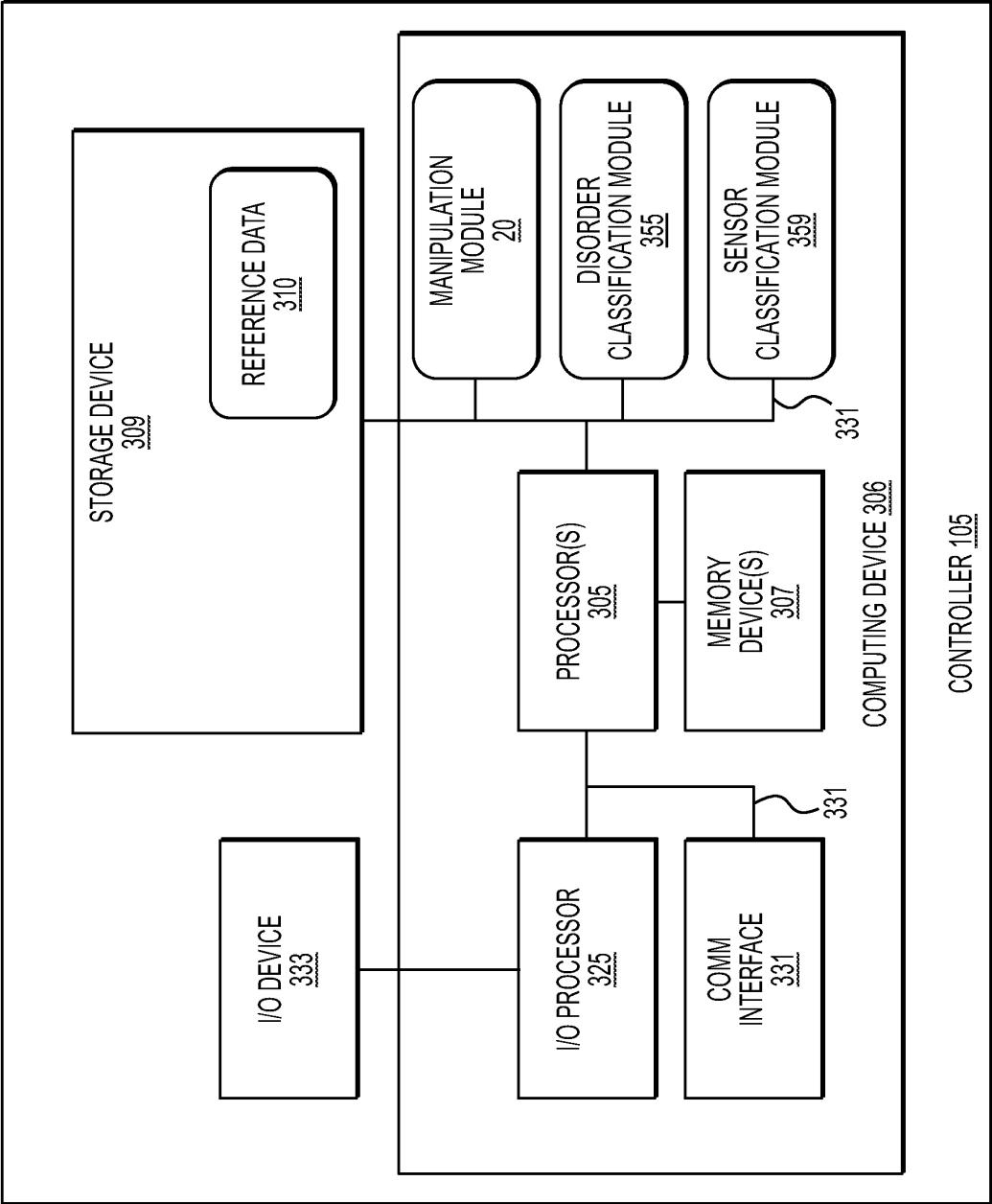
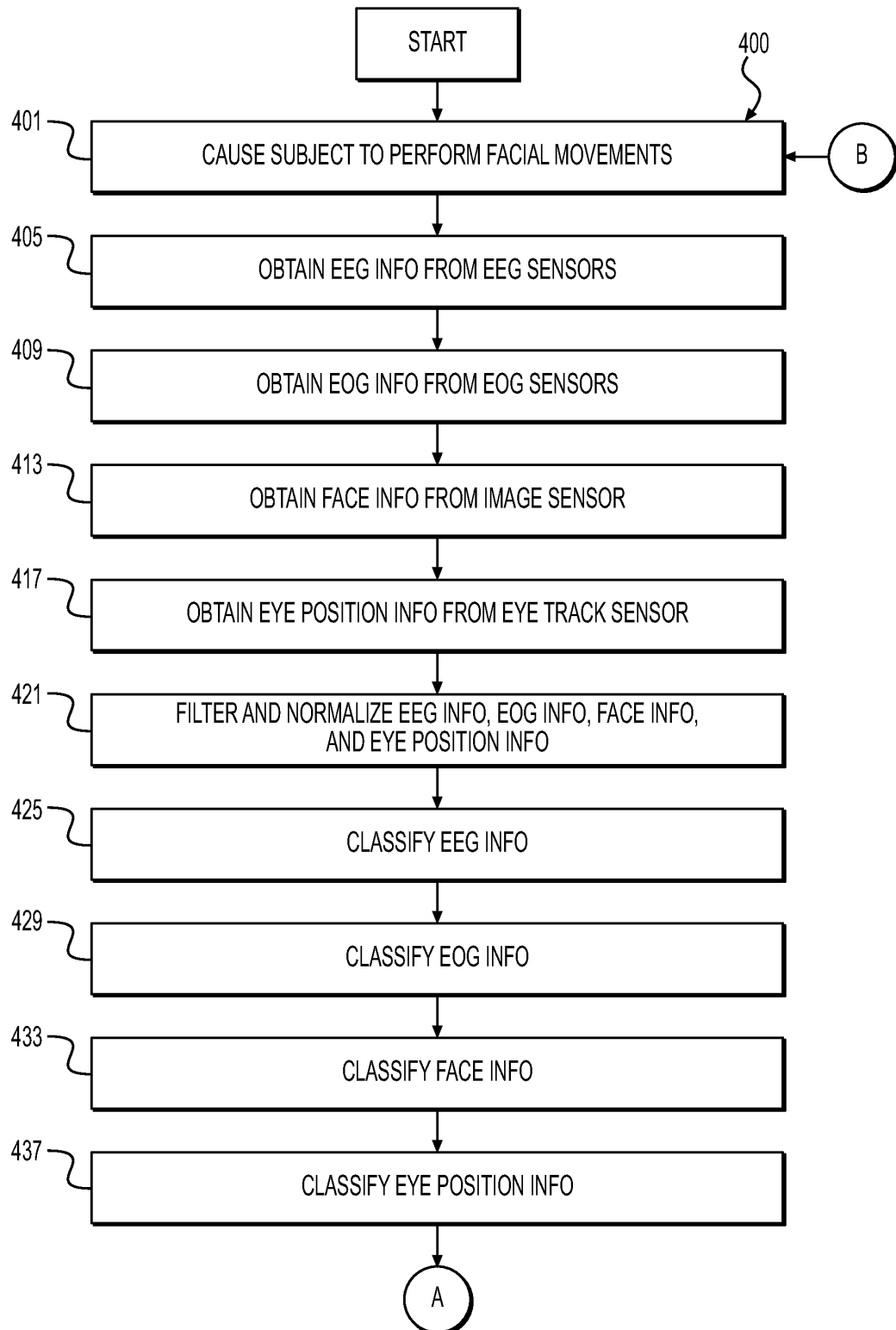
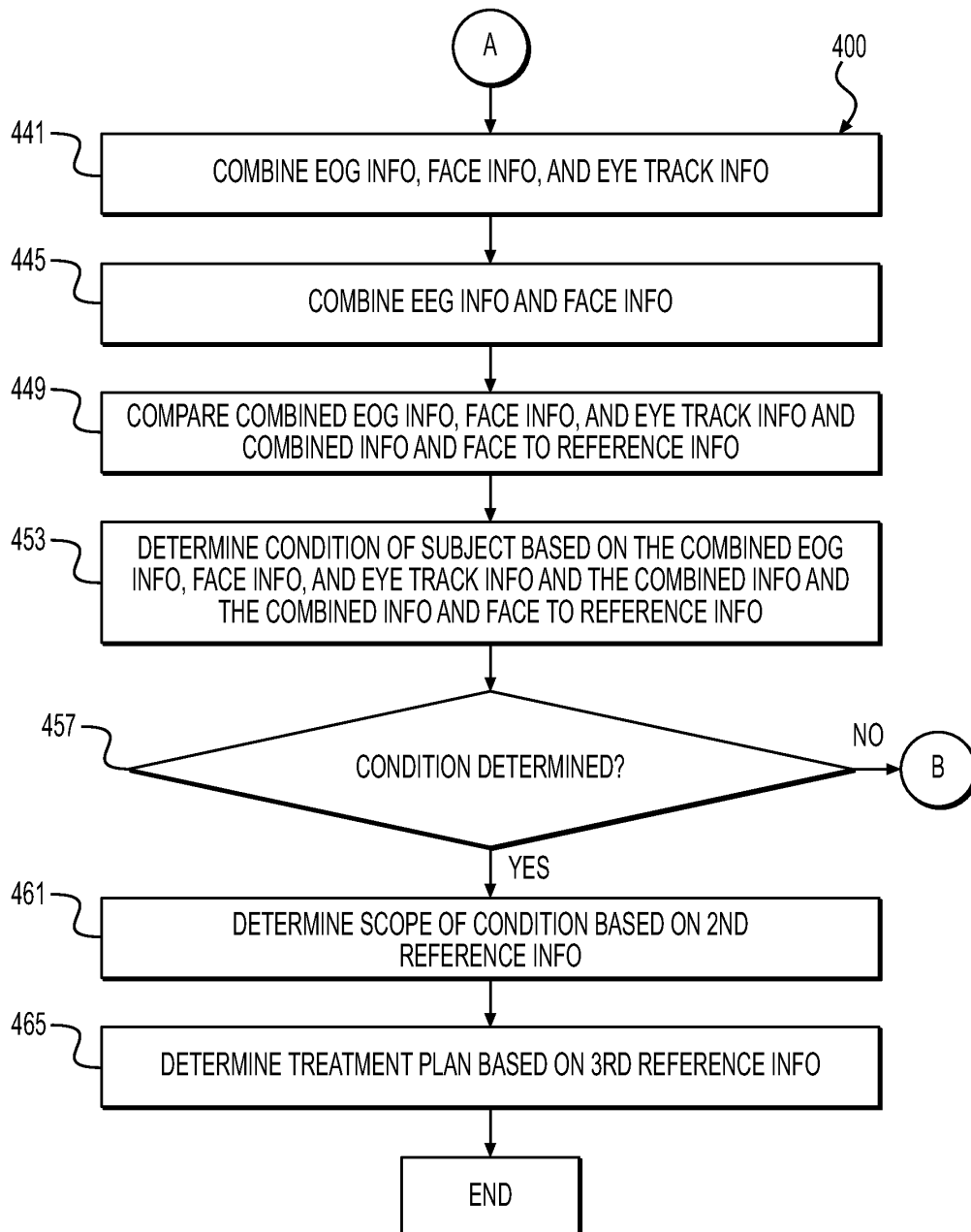


FIG. 3

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**FIG. 4A**

SUBSTITUTE SHEET (RULE 26)

**FIG. 4B**

SUBSTITUTE SHEET (RULE 26)

470

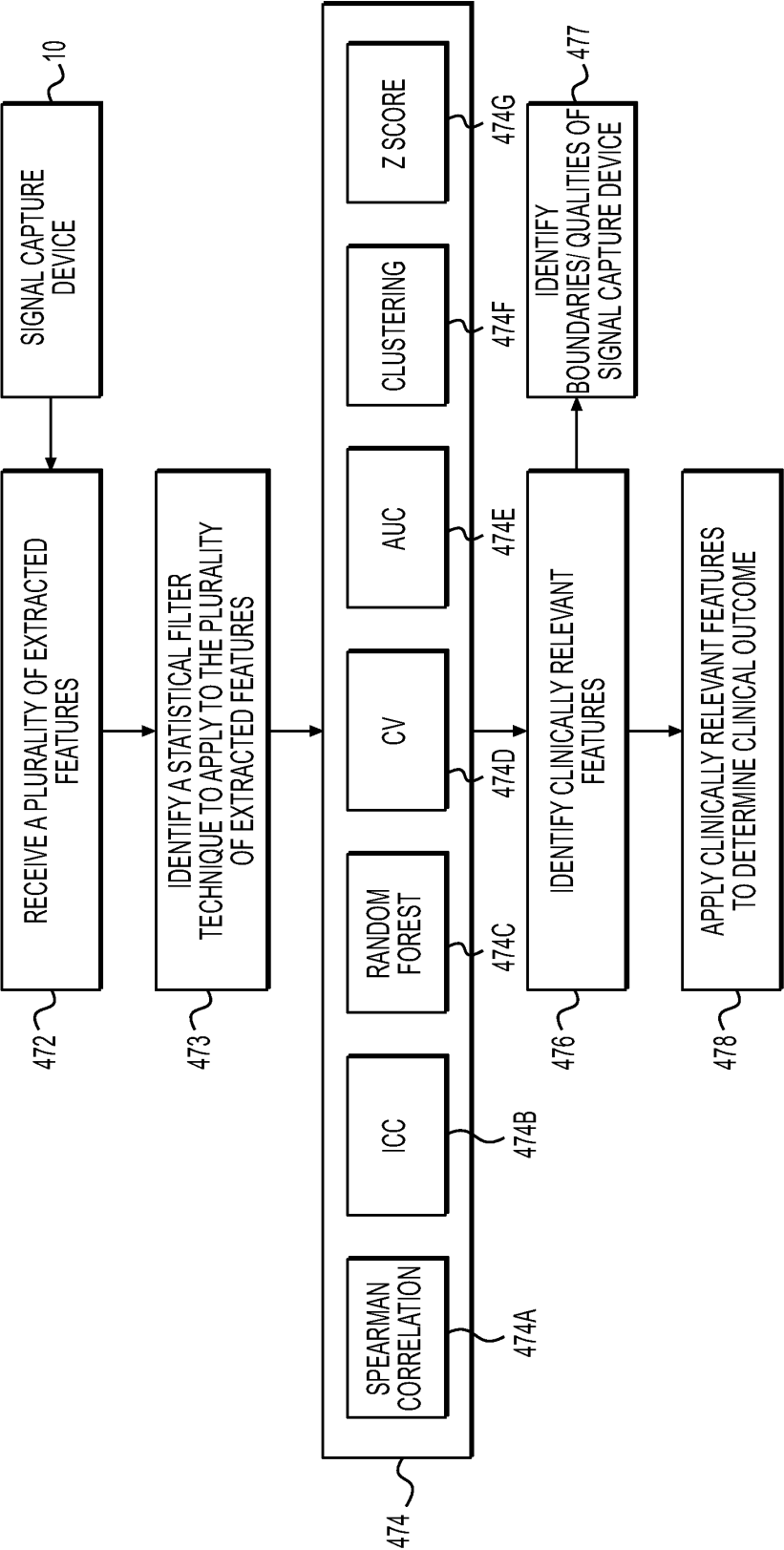


FIG. 4C

504

502

CONDITION	PHYSICIAN SCORE			
PTOSIS, UPWARD EASE (PHYSICIAN EXAM)	>45 SECONDS=0	11-45 SECONDS=1	1-10 SECONDS=2	IMMEDIATE =3
DOUBLE VISION ON LATERAL GAZE, LEFT OR RIGHT (PHYSICIAN EXAM)	>45 SECONDS=0	11-45 SECONDS=1	1-10 SECONDS=3	IMMEDIATE =4
EYE CLOSURE (PHYSICIAN EXAM)	NORMAL=0	MILD WEAKNESS (CAN BE FORCED OPEN WITH EFFORT) =0	MODERATE WEAKNESS (CAN BE FORCED OPEN EASILY) =1	SEVERE WEAKNESS (UNABLE TO KEEP EYE CLOSED) =2
TALKING (PATIENT HISTORY)	NORMAL=0	INTERMITTENT SLURRING OR NASAL SPEECH =2	CONSTANT SLURRING OR NASAL BUT CAN BE UNDERSTOOD =4	DIFFICULT TO UNDERSTAND SPEECH =6
CHEWING (PATIENT HISTORY)	NORMAL=0	FATIGUE WITH SOLID FOOD=2	FATIGUE WITH SOFT FOOD=4	GASTRIC TUBE=6
SWALLOWING (PATIENT HISTORY)	NORMAL=0	RARE EPISODE OF CHOKING OR TROUBLE SWALLOWING =2	FREQUENT TROUBLE SWALLOWING, FOR EXAMPLE NECESSITATING CHANGE IN DIET =5	GASTRIC TUBE=6
BREATHING (THOUGHT TO BE CAUSED BY MG)	NORMAL=0	SHORTNESS OF BREATH WITH EXERTION=2	SHORTNESS OF BREATH AT REST =4	VENTILATOR DEPENDENCE =9
NECK FLEXION OR EXTENSION (PHYSICIAN EXAM)	NORMAL=0	MILD WEAKNESS=1	MODERATE WEAKNESS =3	SEVERE WEAKNESS =4
SHOULDER ABDUCTION (PHYSICIAN EXAM)	NORMAL=0	MILD WEAKNESS=2	MODERATE WEAKNESS =4	SEVERE WEAKNESS =5
HIP FLEXION PHYSICIAN EXAM	NORMAL=0	MILD WEAKNESS=2	MODERATE WEAKNESS =4	SEVERE WEAKNESS =5

FIG. 5

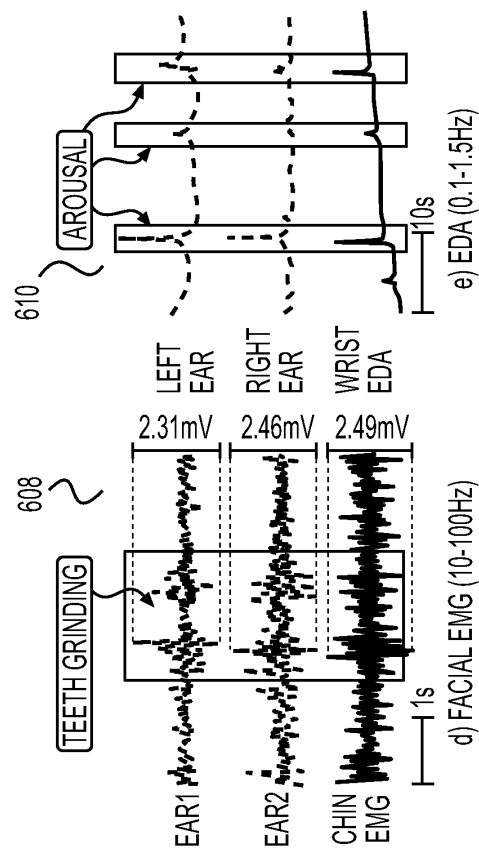
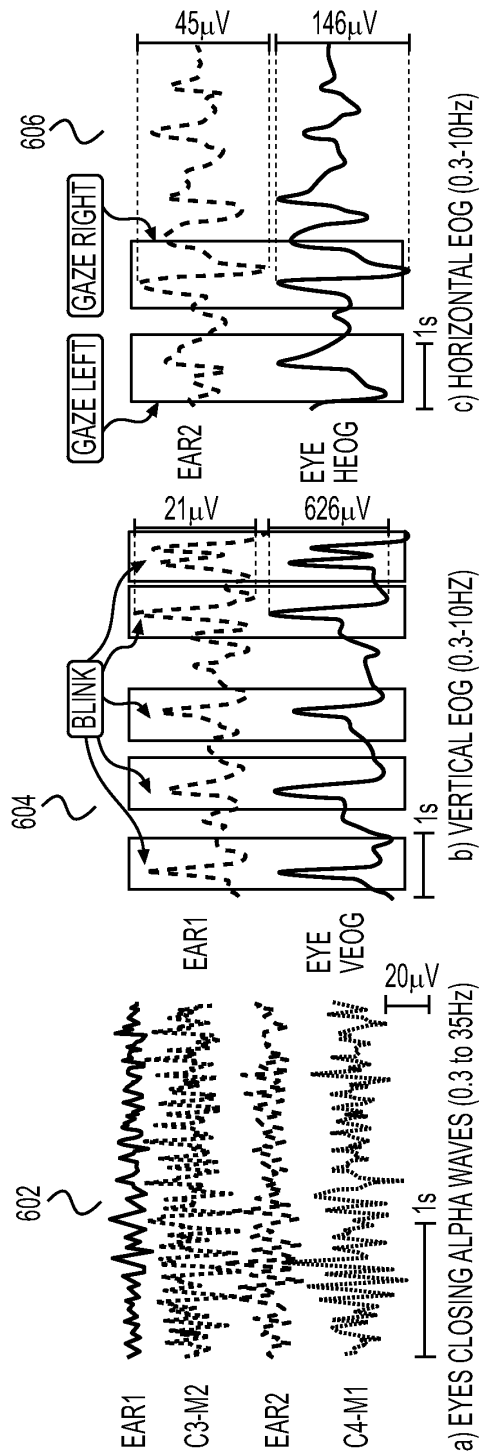


FIG. 6

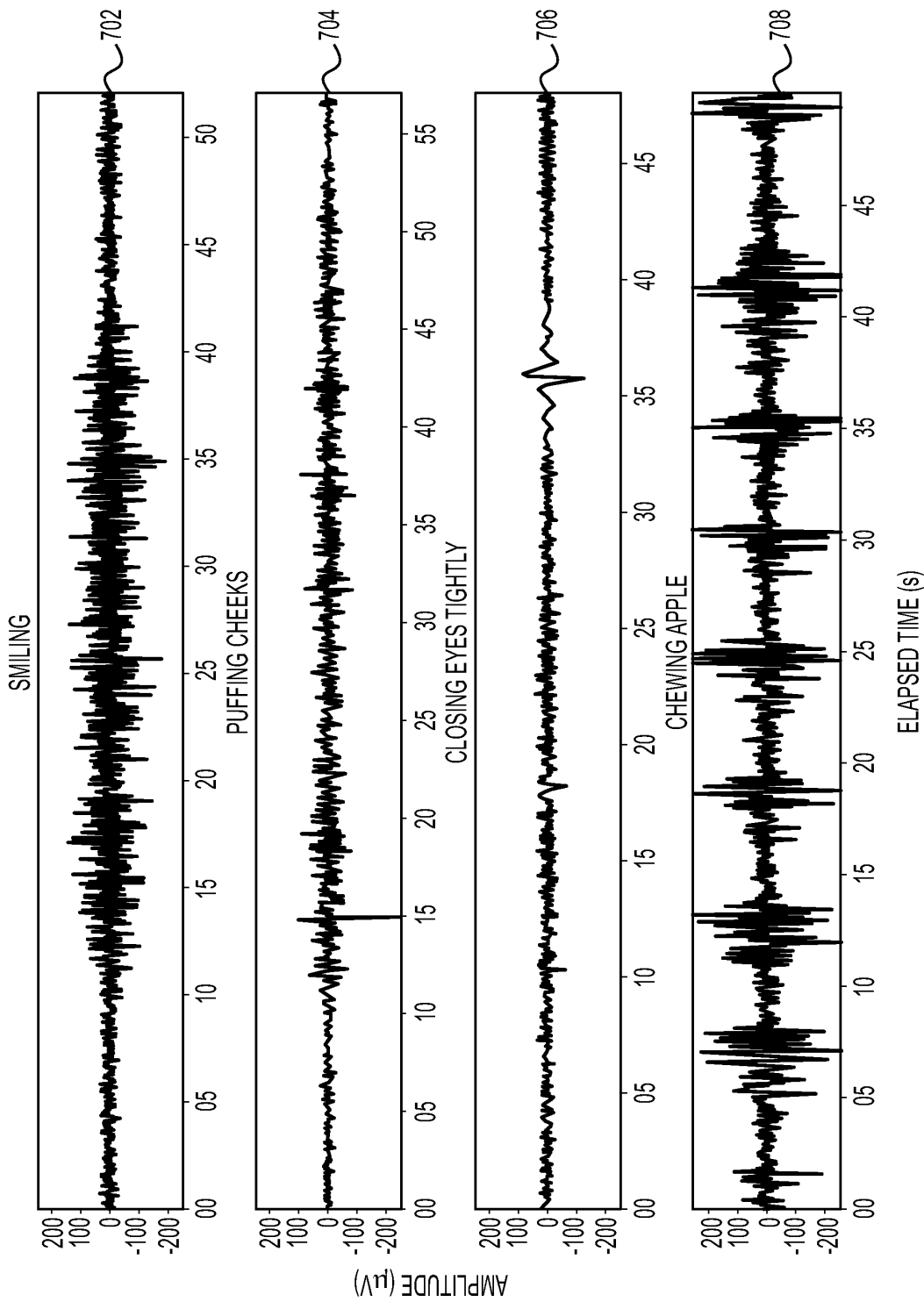


FIG. 7

802

FEATURE	COMMENTS
FRACTAL DIMENSION	INDICATOR OF SIGNAL COMPLEXITY. (HAS APPLICATIONS IN ANALYSIS OF BIOSIGNALS SUCH AS EEG AND HEART RATE)
SAMPLE ENTROPY	CAN REFLECT AMOUNT OF IRREGULARITY IN THE EMG SIGNAL DATA. (OFTEN USED IN AS A FEATURE FOR EPILEPSY DETECTION USING EEG SIGNALS)
PEAK FREQUENCY CONTRACTIONS	NUMBER OF CONTRACTION AT PEEK FREQUENCY OF THE EMG SIGNAL.
SPECTRAL ENTROPY	A MEASURE OF SIGNAL IRREGULARITY IN THE FREQUENCY DOMAIN (COMMONLY USED FEATURE IN BIOSIGNAL PROCESSING AND SPEECH RECOGNITION)
79-102, 102-125 Hz BANDPOWER	HIGH MAGNITUDE MUSCLE ACTIVATION COMMONLY INDUCES HIGH FREQUENCY EMG ACTIVITY. SUCH ACTIVITIES (e.g., CHEWING) TEND TO EXHIBIT HIGH POWER AT THESE FREQUENCIES.

TO FIG. 8
CONT. 1
→

FIG. 8

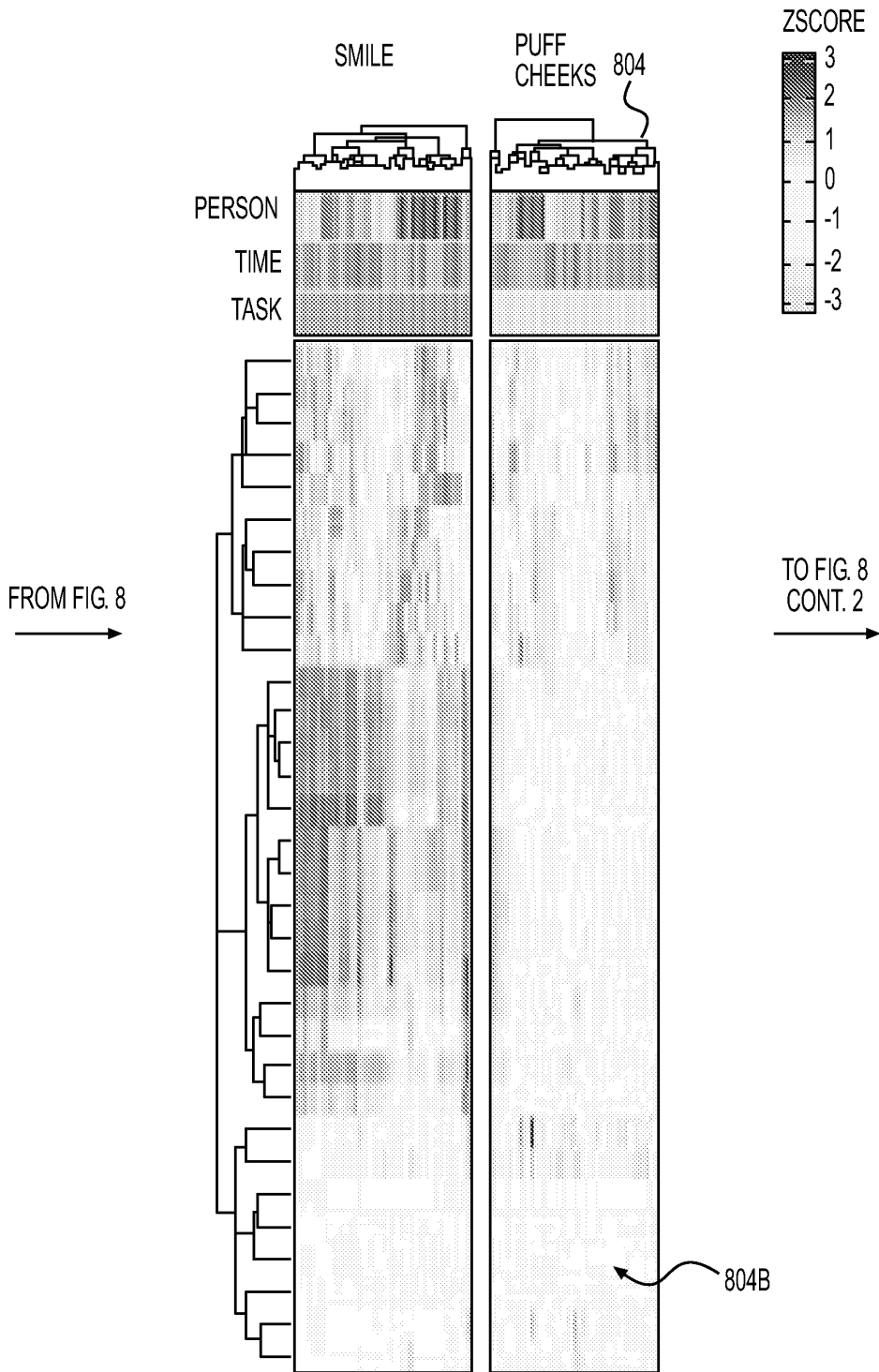


FIG. 8 (CONT. 1)

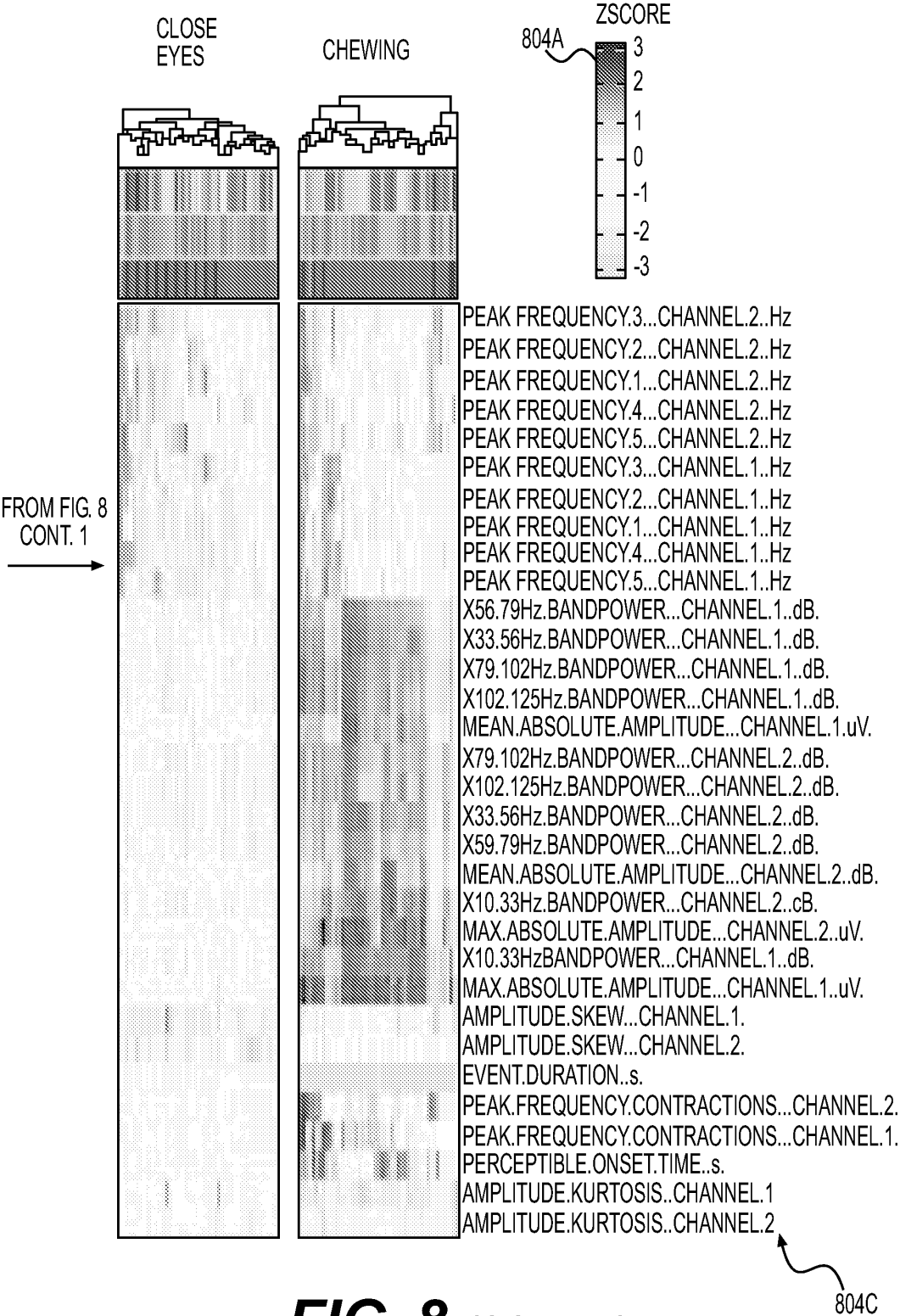


FIG. 8 (CONT. 2)
SUBSTITUTE SHEET (RULE 26)

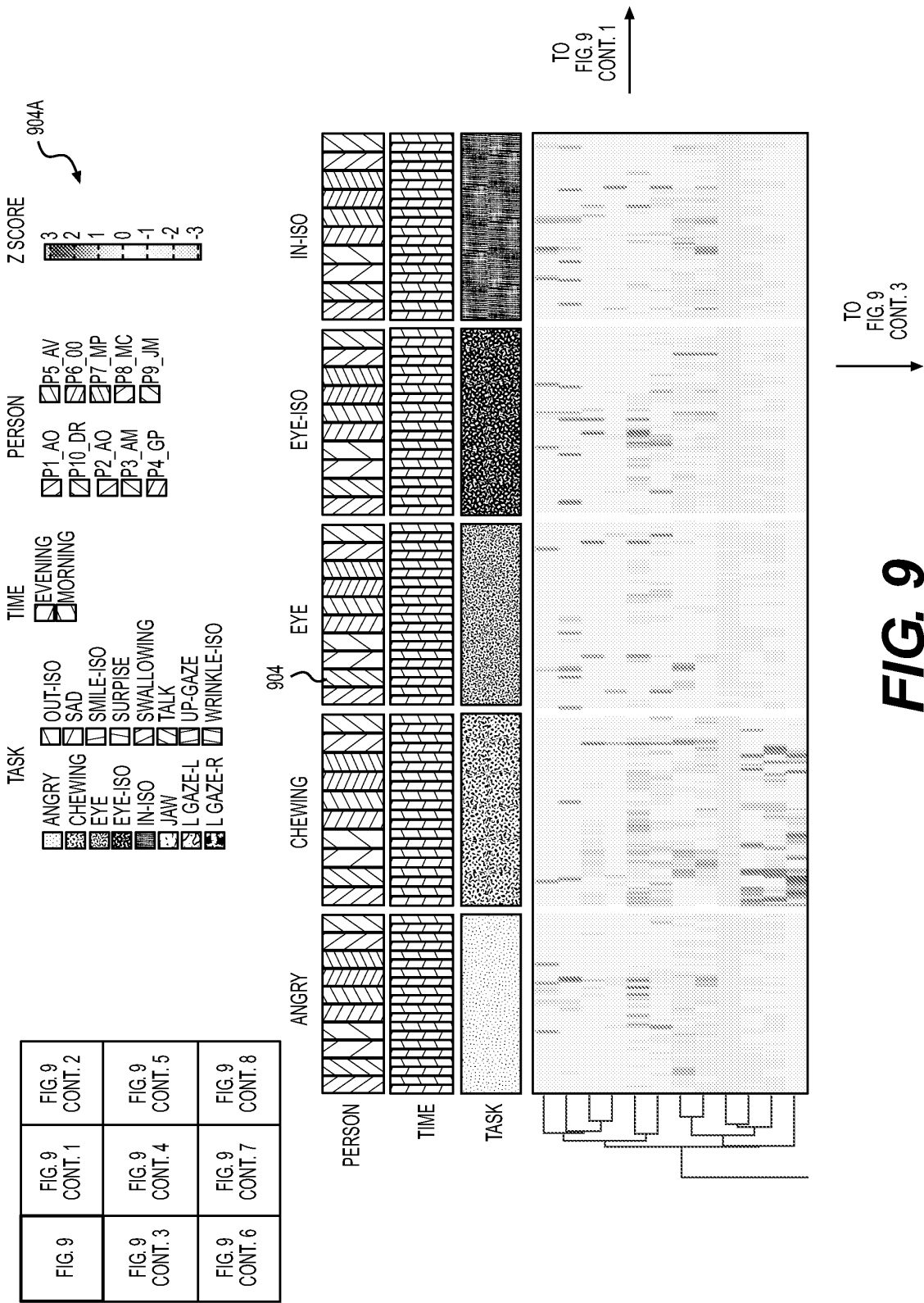
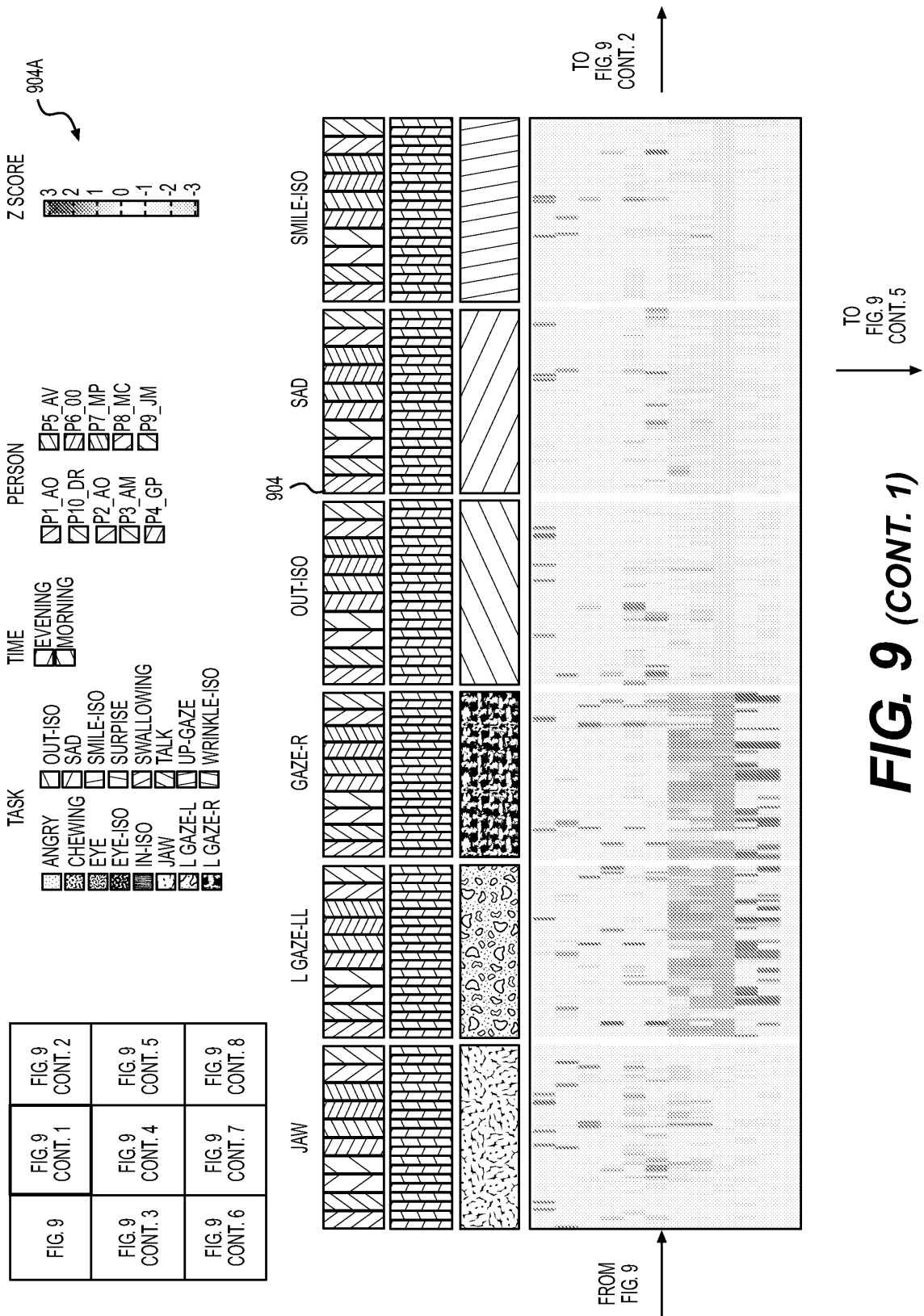
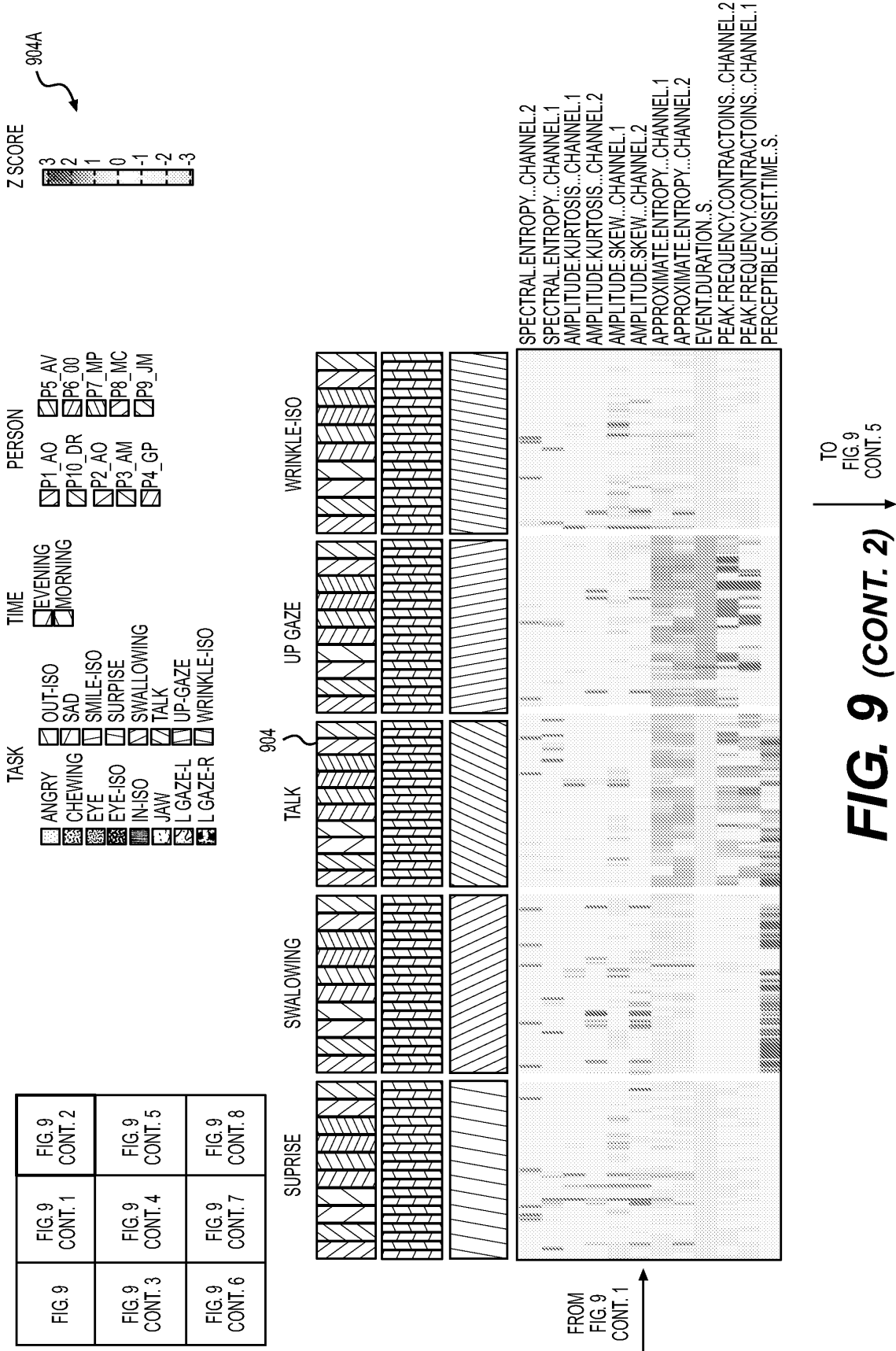
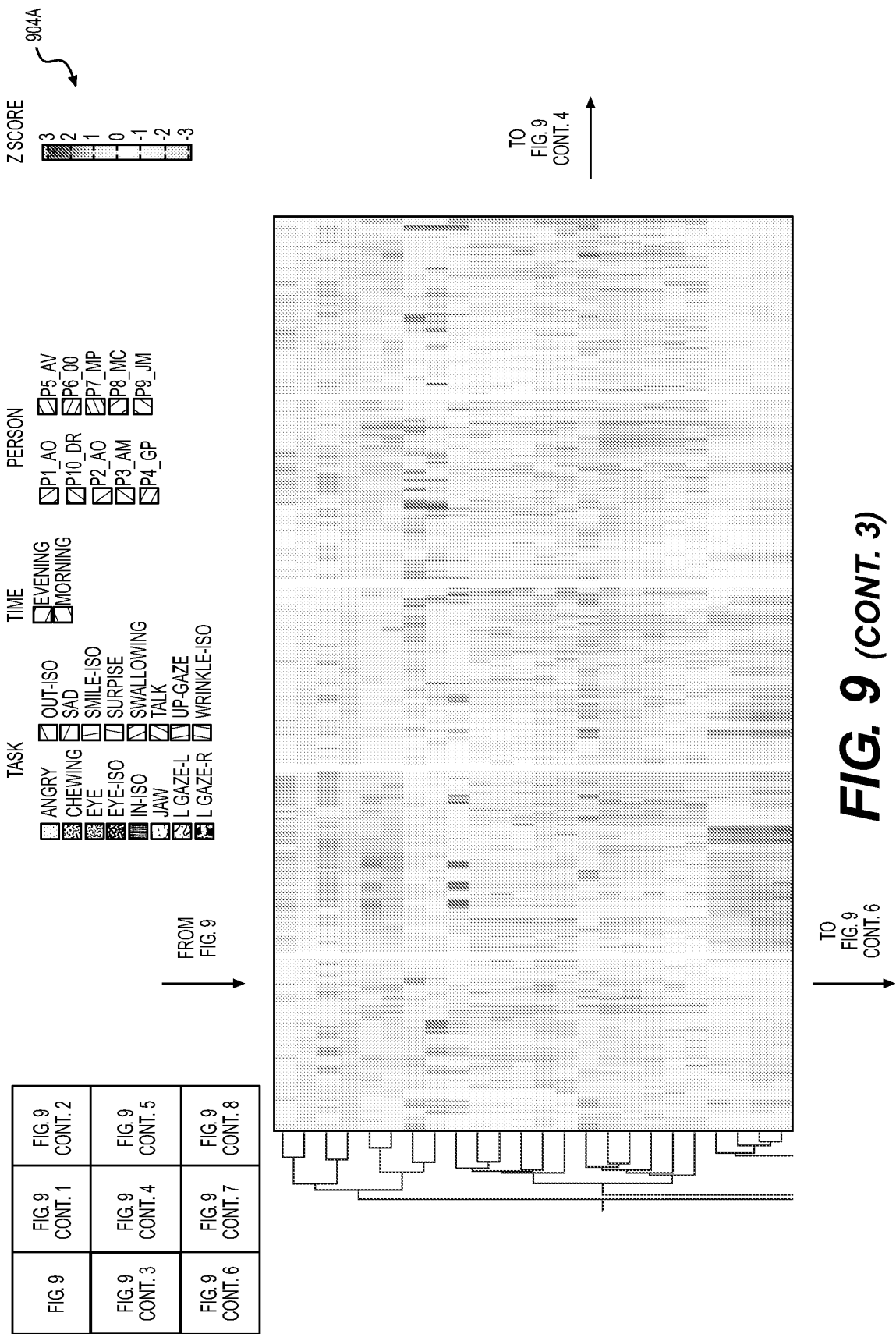


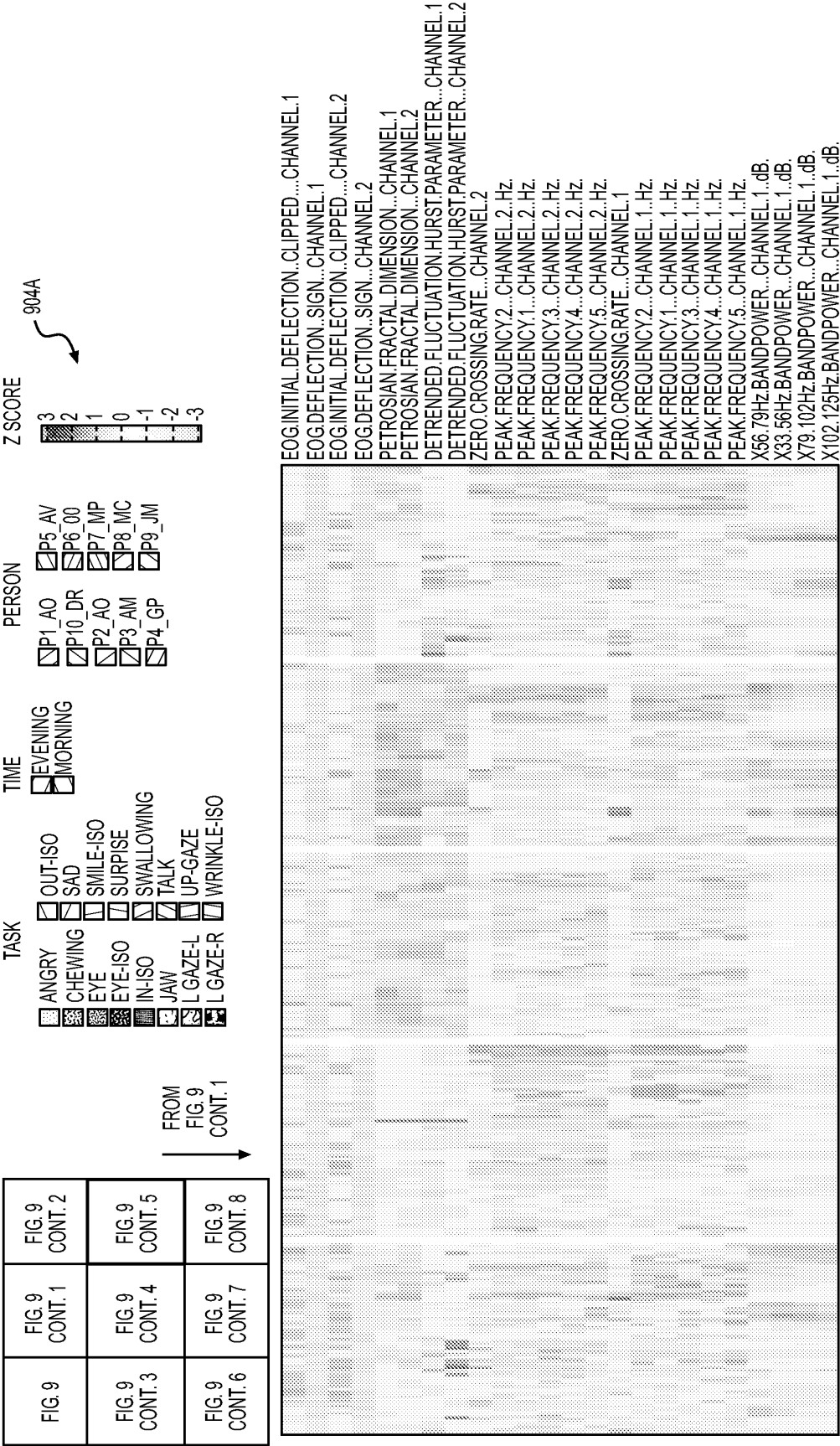
FIG. 9











Z SCORE

3

2

1

0

-1

-2

-3

904A

EOG INITIAL DEFLECTION..CLIPPED....CHANNEL.1

EOG DEFLECTION..SIGN...CHANNEL.1

EOG INITIAL DEFLECTION..CLIPPED....CHANNEL.2

EOG DEFLECTION..SIGN...CHANNEL.2

PETROSIAN FRACTAL DIMENSION...CHANNEL.1

PETROSIAN FRACTAL DIMENSION...CHANNEL.2

DETRENDED FLUCTUATION..HURST.PARAMETER...CHANNEL.1

DETRENDED FLUCTUATION..HURST.PARAMETER...CHANNEL.2

ZERO CROSSING RATE...CHANNEL.2

PEAK FREQUENCY.2...CHANNEL.2.Hz.

PEAK FREQUENCY.1...CHANNEL.2.Hz.

PEAK FREQUENCY.3...CHANNEL.2.Hz.

PEAK FREQUENCY.4...CHANNEL.2.Hz.

PEAK FREQUENCY.5...CHANNEL.2.Hz.

ZERO CROSSING RATE...CHANNEL.1

PEAK FREQUENCY.2...CHANNEL.1.Hz.

PEAK FREQUENCY.1...CHANNEL.1.Hz.

PEAK FREQUENCY.3...CHANNEL.1.Hz.

PEAK FREQUENCY.4...CHANNEL.1.Hz.

PEAK FREQUENCY.5...CHANNEL.1.Hz.

X56.79Hz BANDPOWER...CHANNEL.1.dB.

X33.56Hz BANDPOWER...CHANNEL.1.dB.

X79.102Hz BANDPOWER...CHANNEL.1.dB.

X102.125Hz BANDPOWER...CHANNEL.1.dB.

FIG. 9 (CONT. 5)

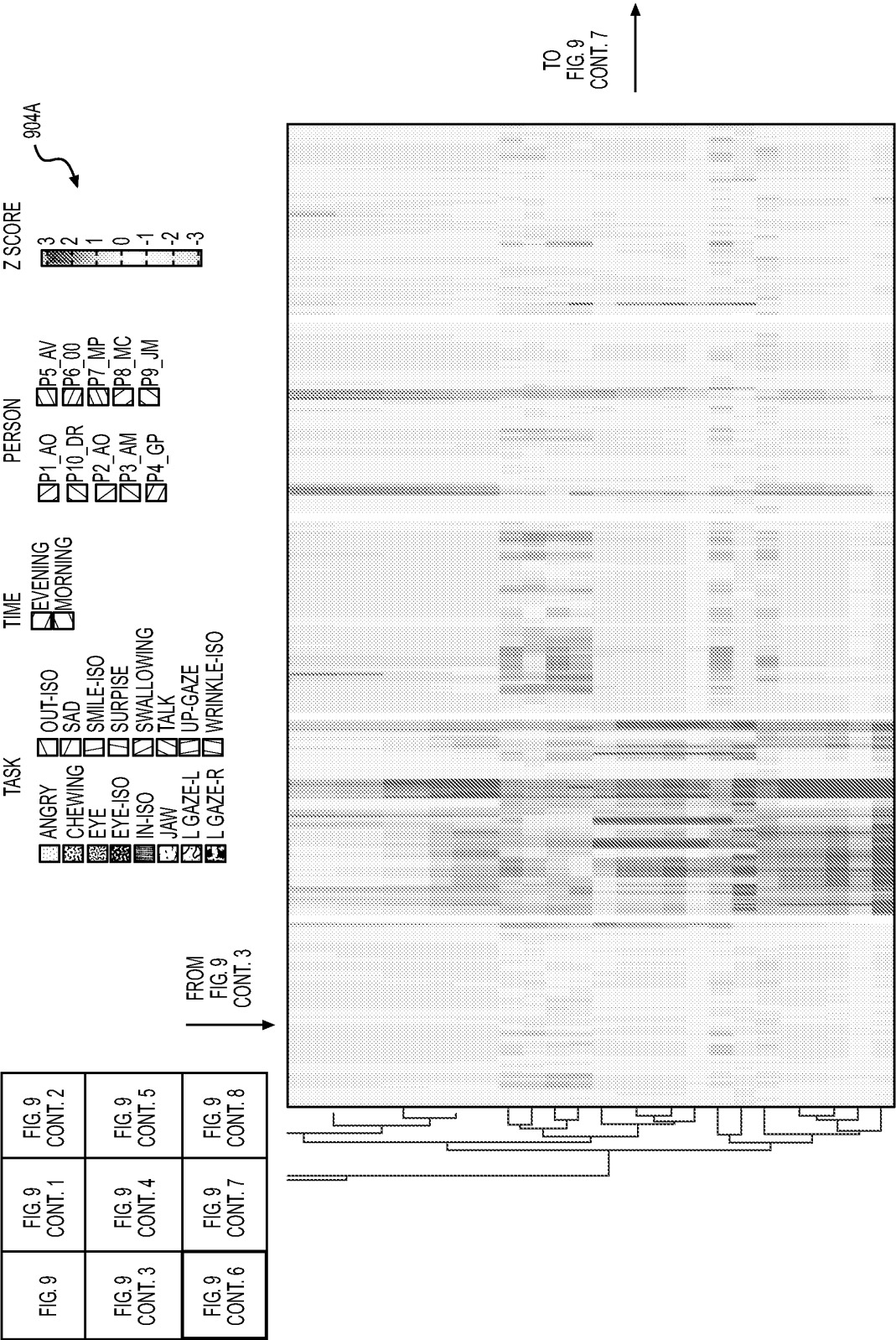


FIG. 9 (CONT. 6)



FIG. 9 (CONT. 7)

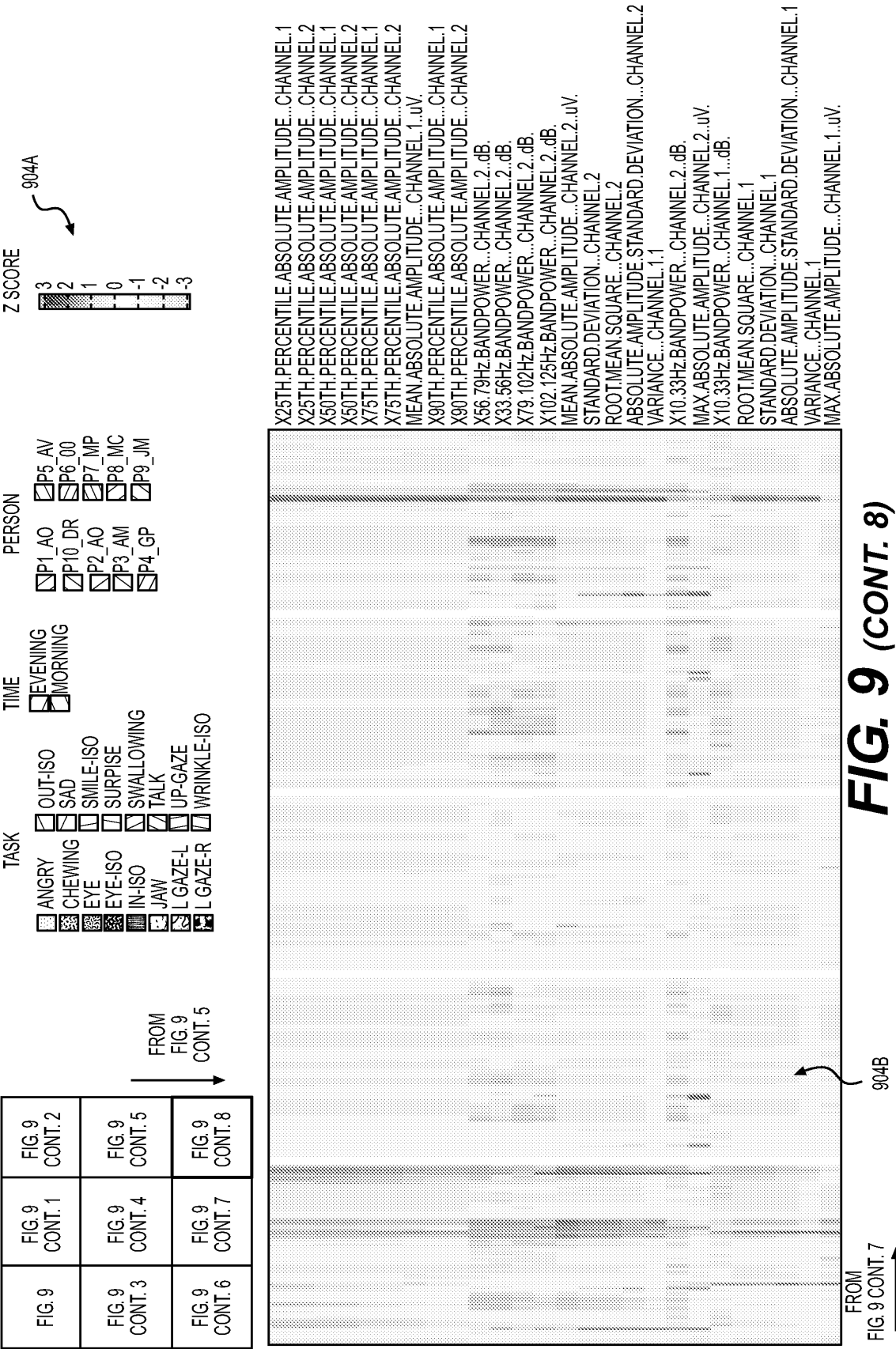


FIG. 9 (CONT. 8)

FIG. 10	FIG. 10 CONT. 1	FIG. 10 CONT. 2
FIG. 10 CONT. 3	FIG. 10 CONT. 4	FIG. 10 CONT. 5

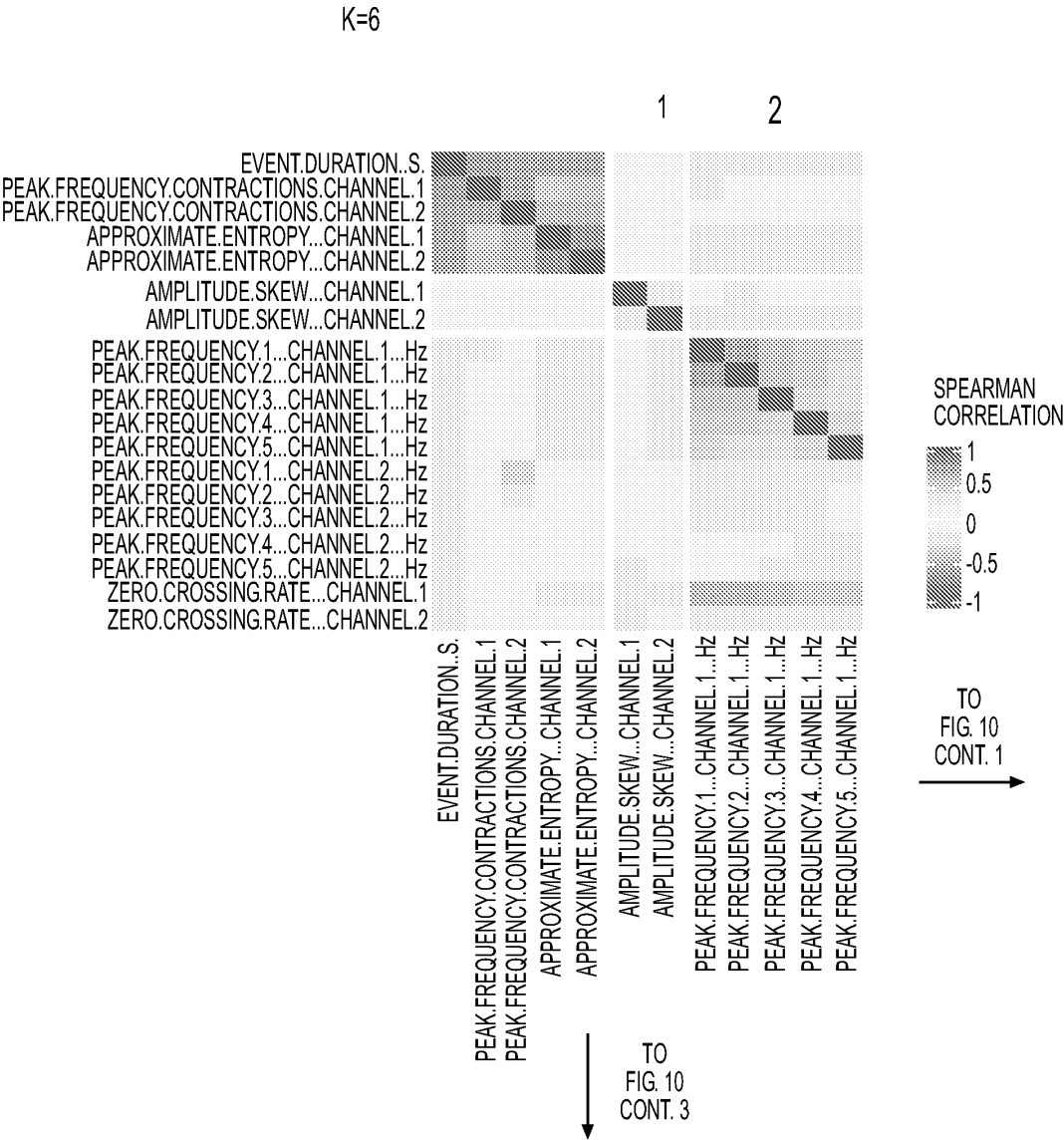


FIG. 10

FIG. 10	FIG. 10 CONT. 1	FIG. 10 CONT. 2
FIG. 10 CONT. 3	FIG. 10 CONT. 4	FIG. 10 CONT. 5

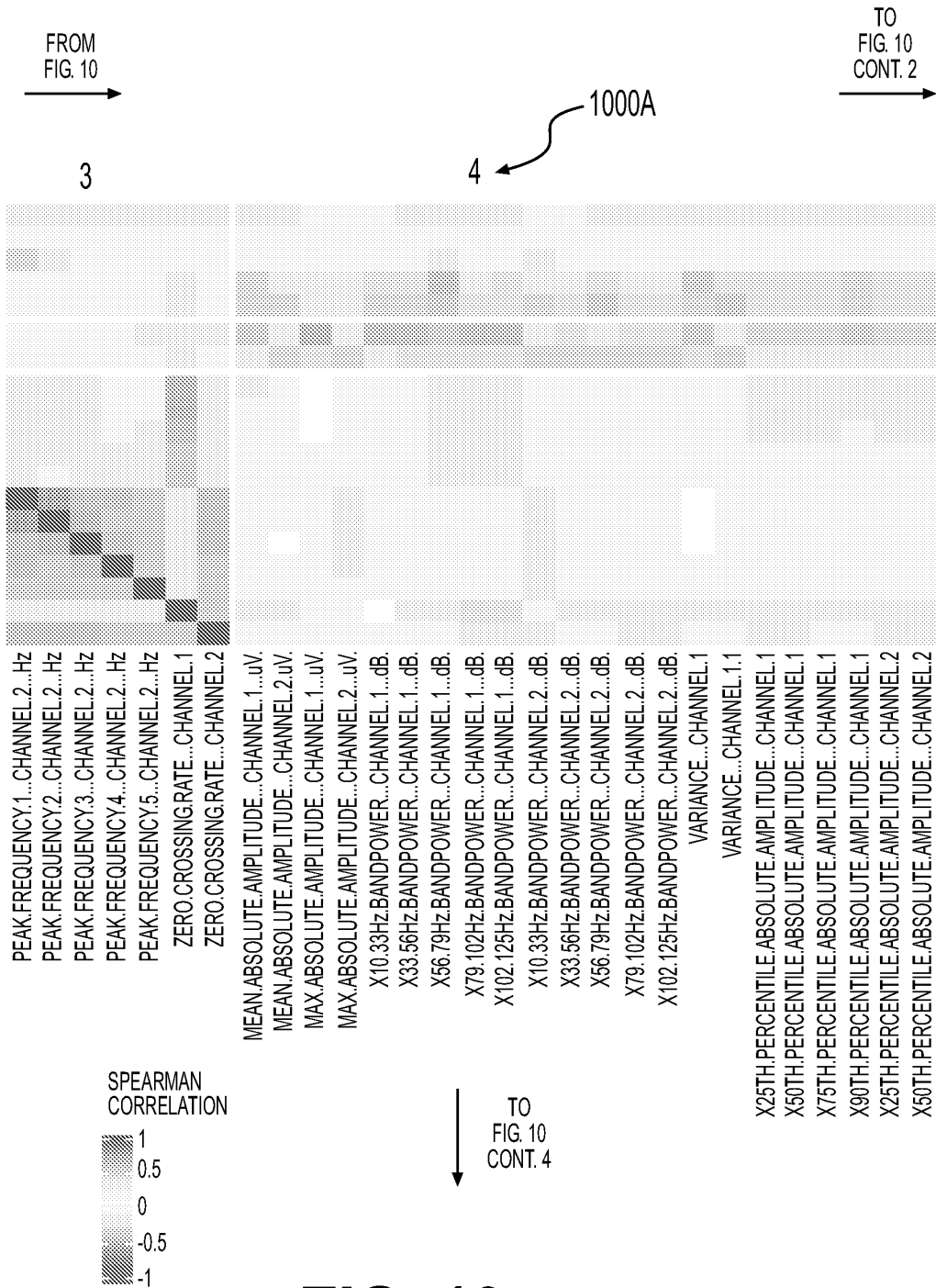


FIG. 10 (CONT. 1)

SUBSTITUTE SHEET (RULE 26)

FIG. 10	FIG. 10 CONT. 1	FIG. 10 CONT. 2
FIG. 10 CONT. 3	FIG. 10 CONT. 4	FIG. 10 CONT. 5

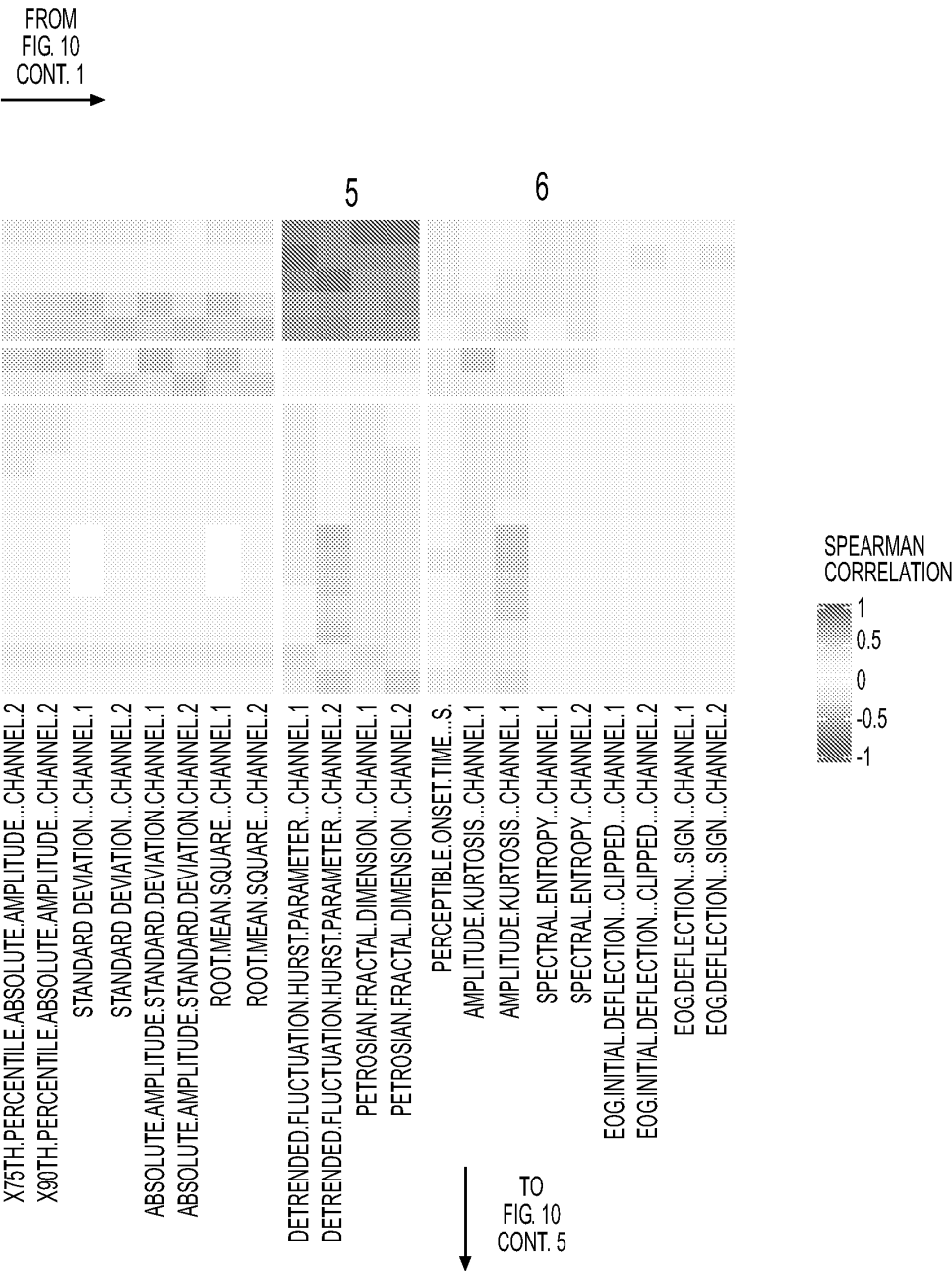


FIG. 10 (CONT. 2)

SUBSTITUTE SHEET (RULE 26)

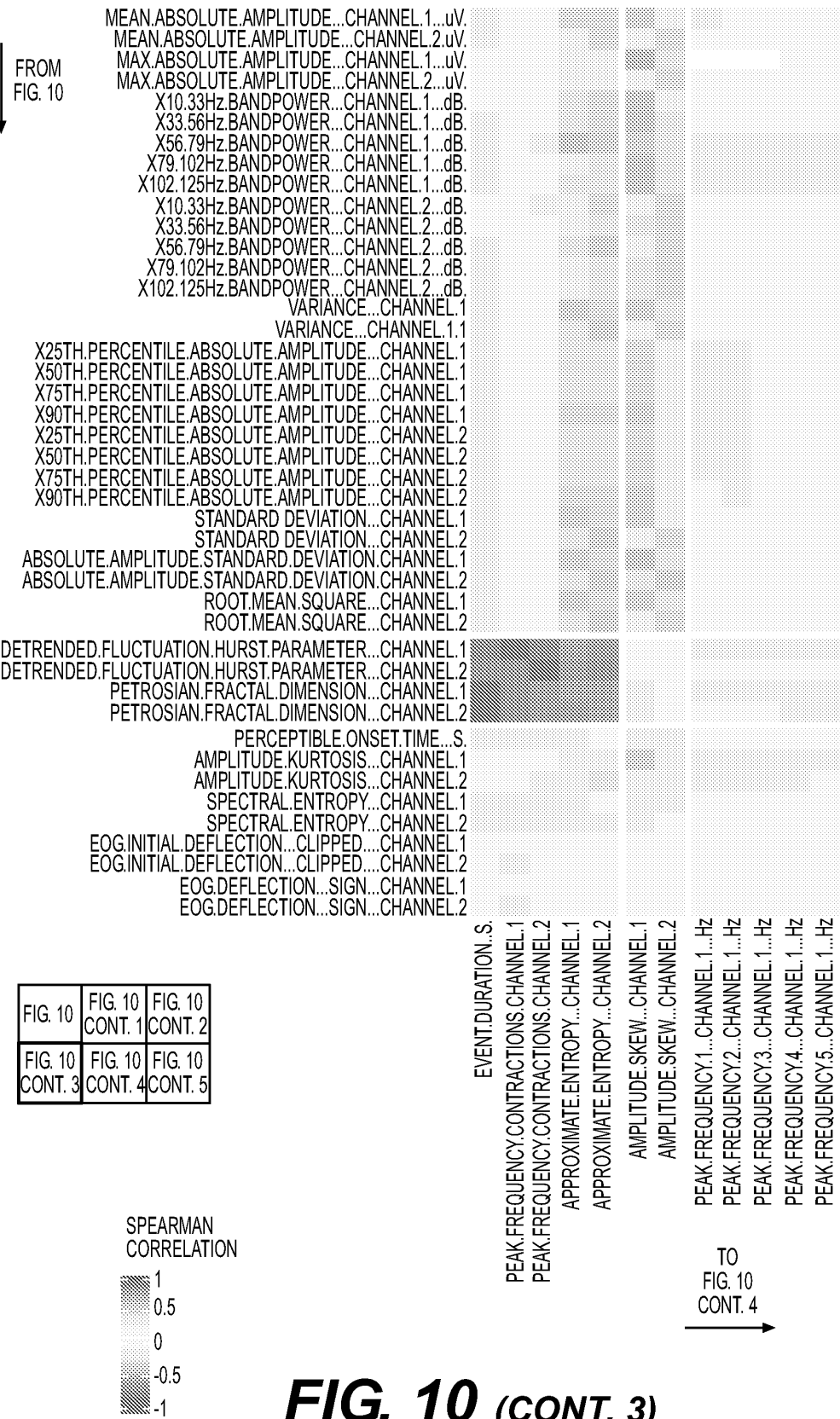




FIG. 10	FIG. 10	FIG. 10
CONT. 3	CONT. 4	CONT. 5
FIG. 10	FIG. 10	FIG. 10
CONT. 3	CONT. 4	CONT. 5

FIG. 10 (CONT. 4)

SUBSTITUTE SHEET (RULE 26)

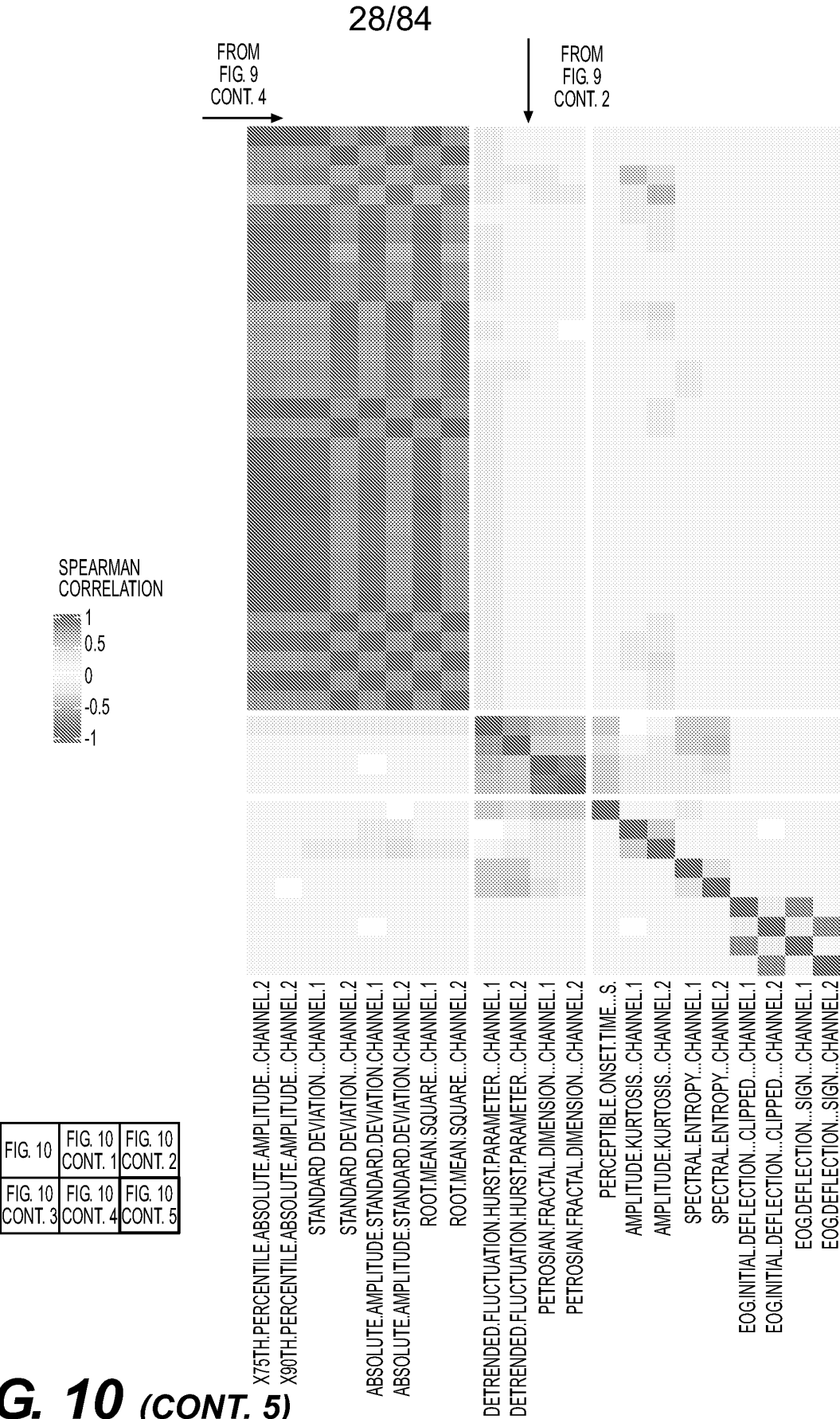
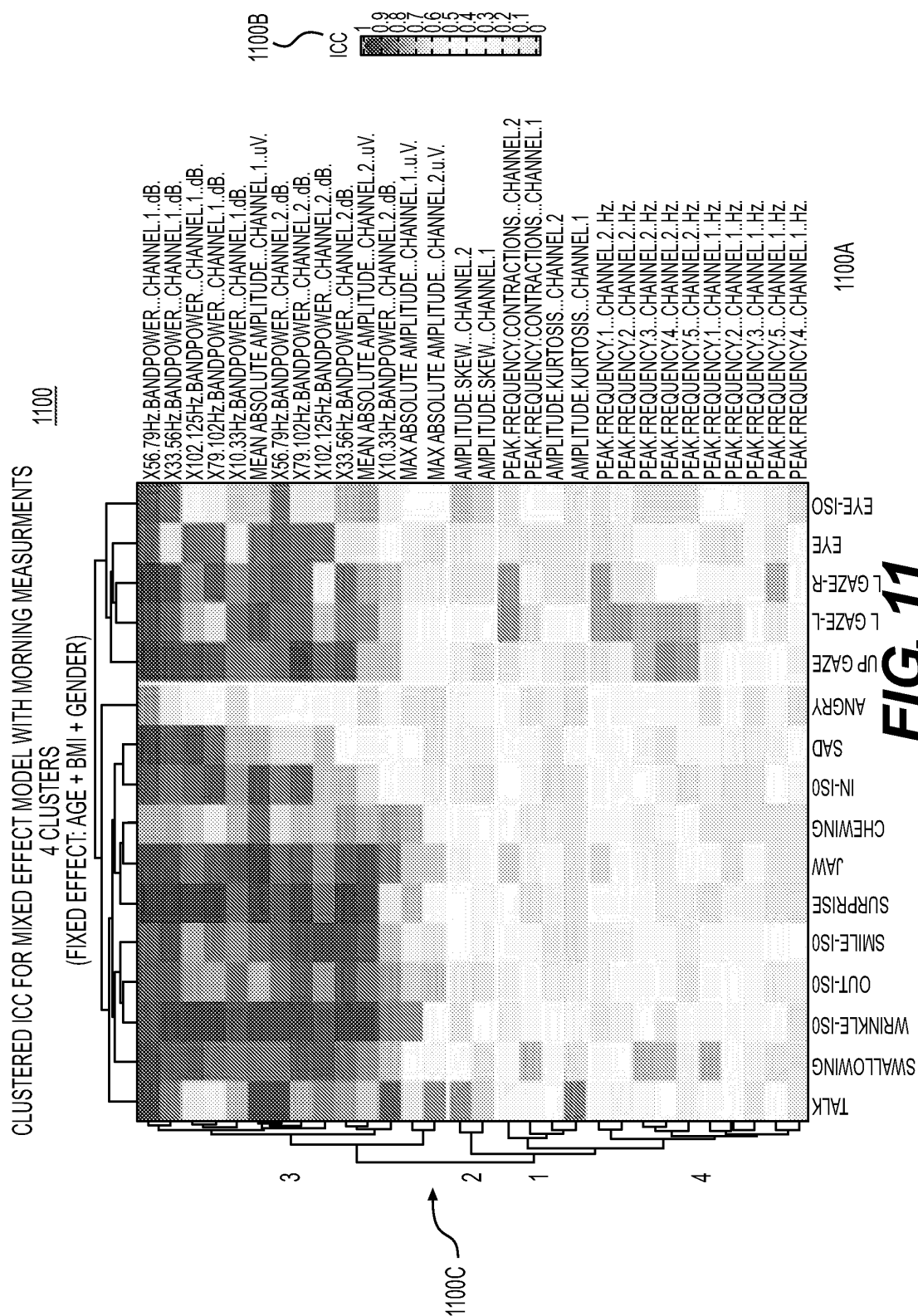


FIG. 10 (CONT. 5)



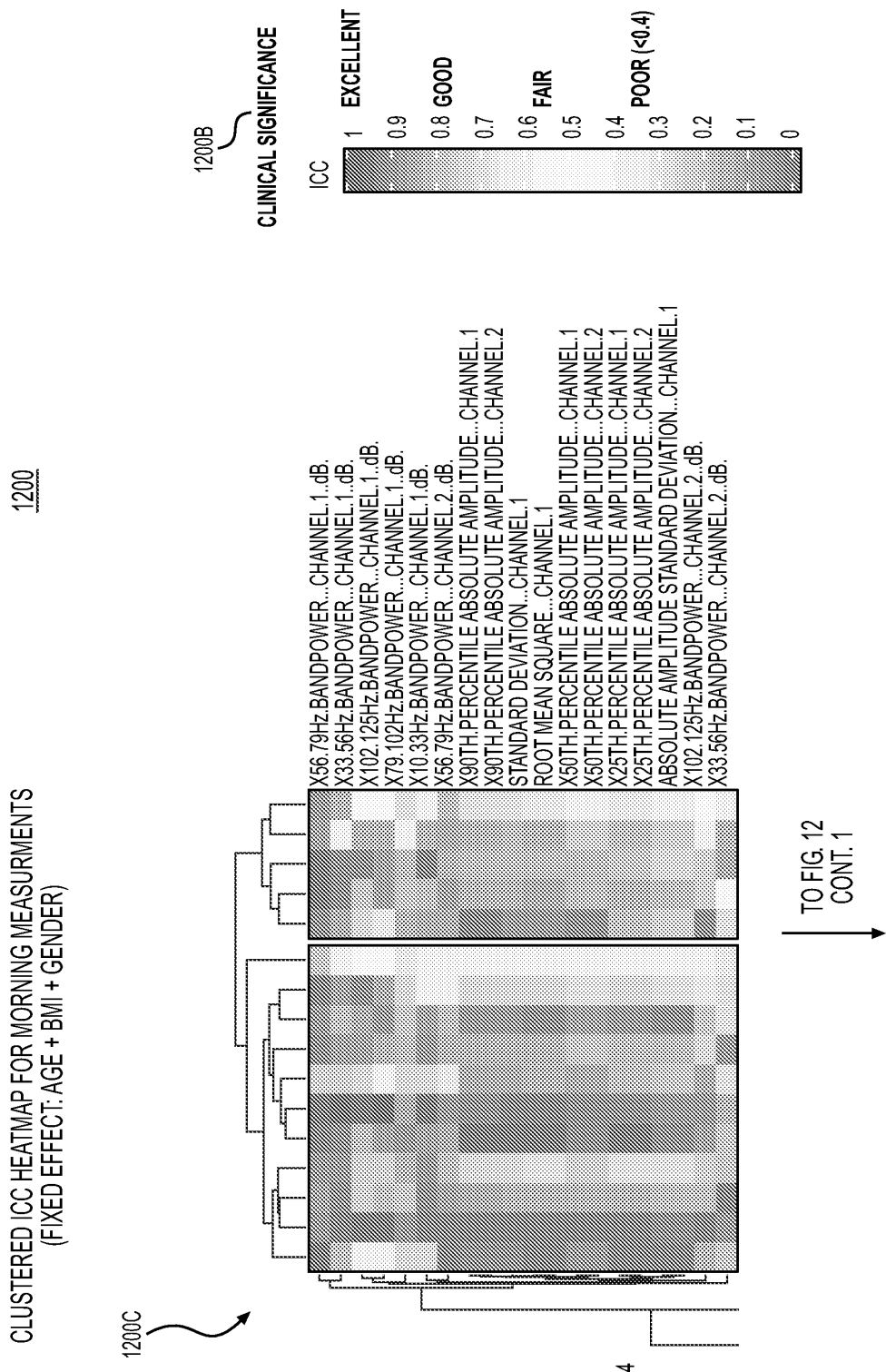


FIG. 12

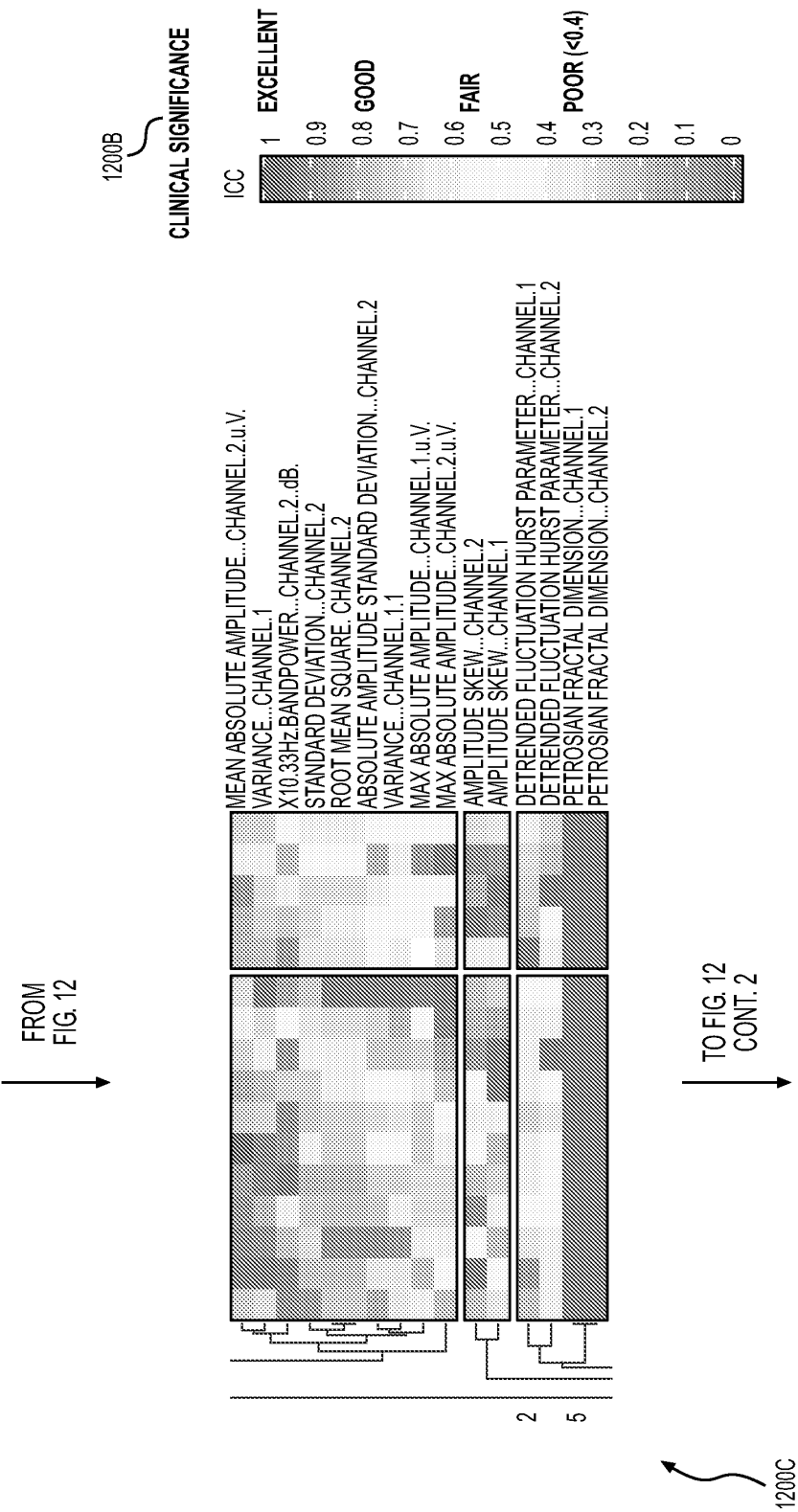


FIG. 12 (CONT. 1)

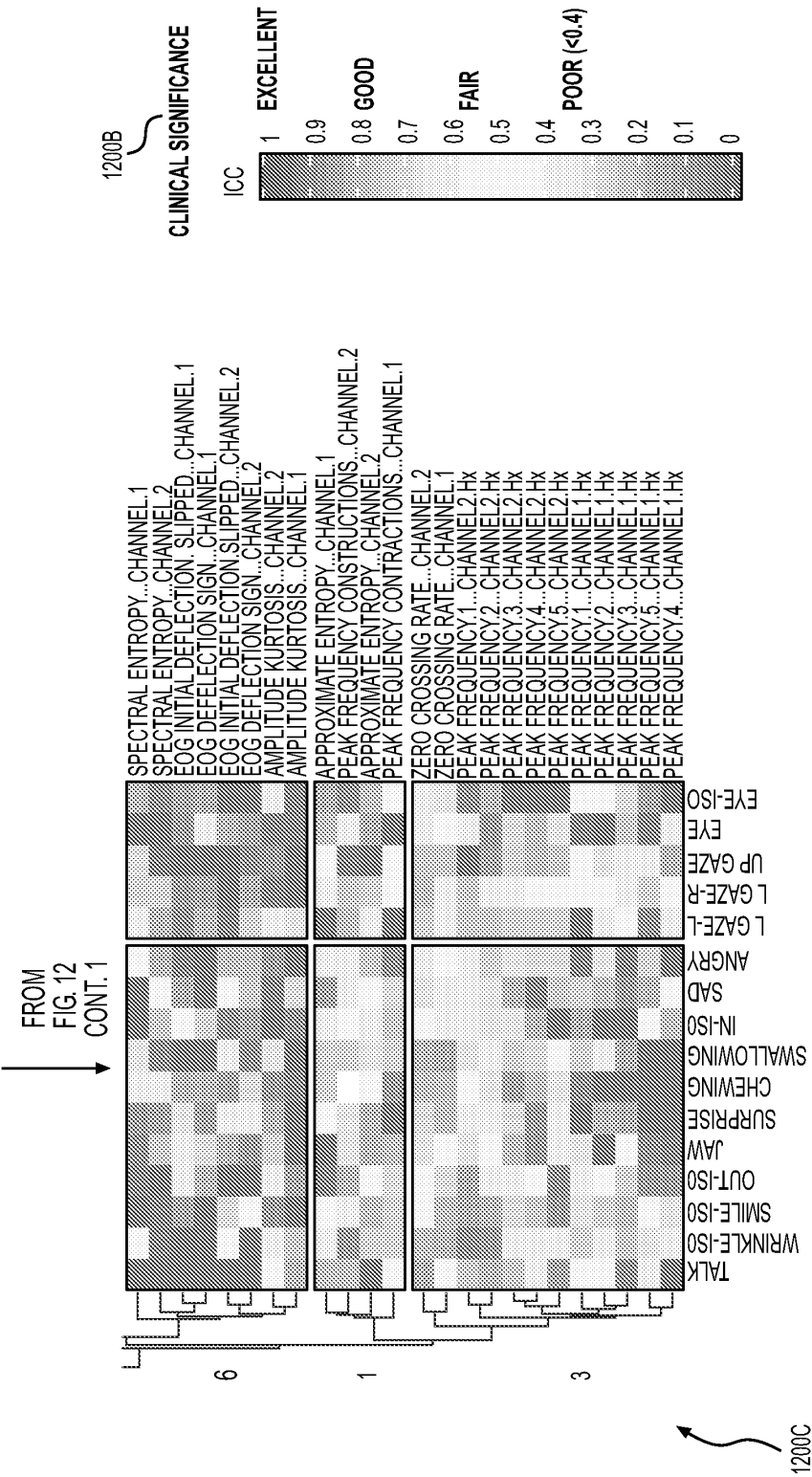


FIG. 12 (CONT. 2)

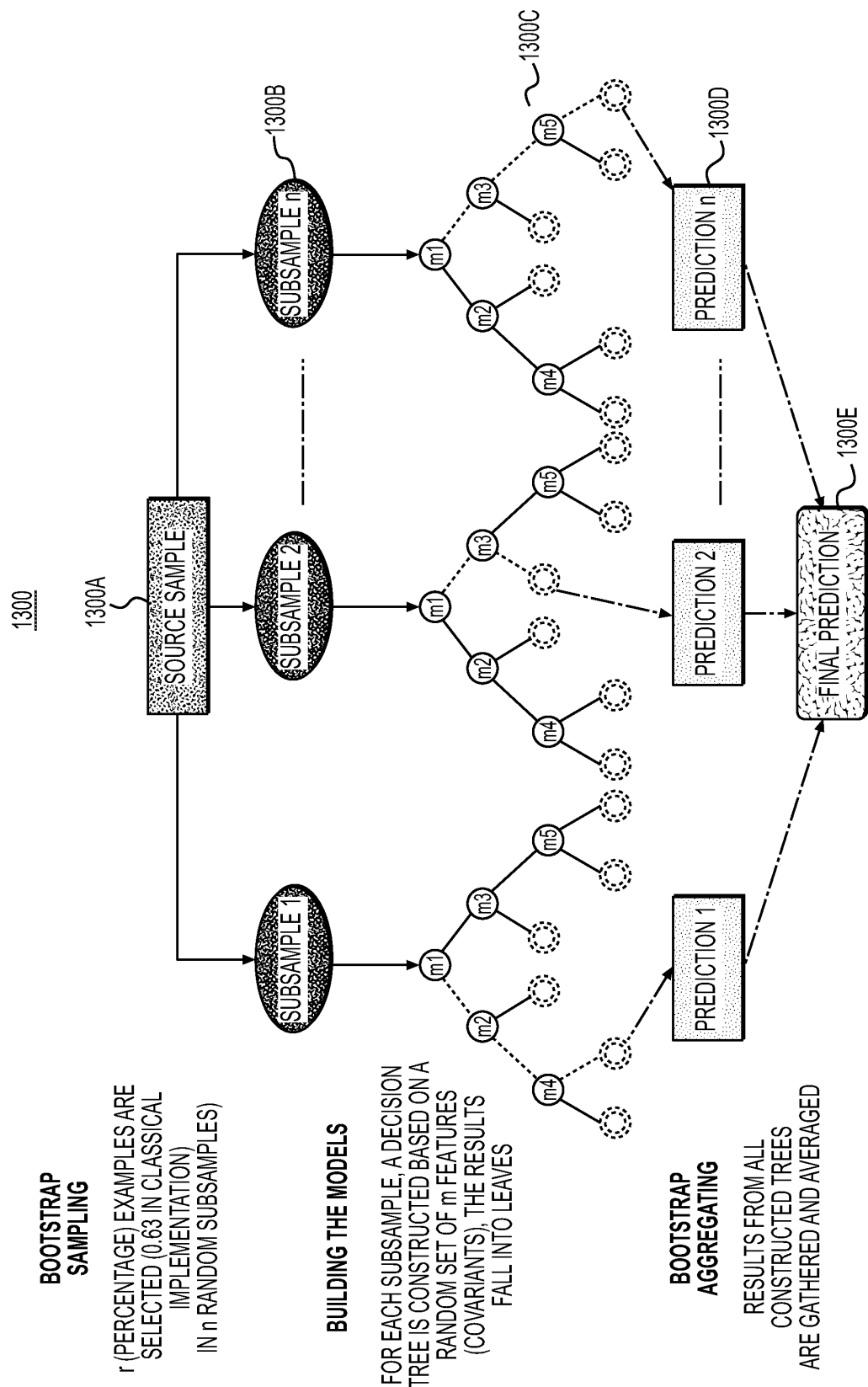


FIG. 13

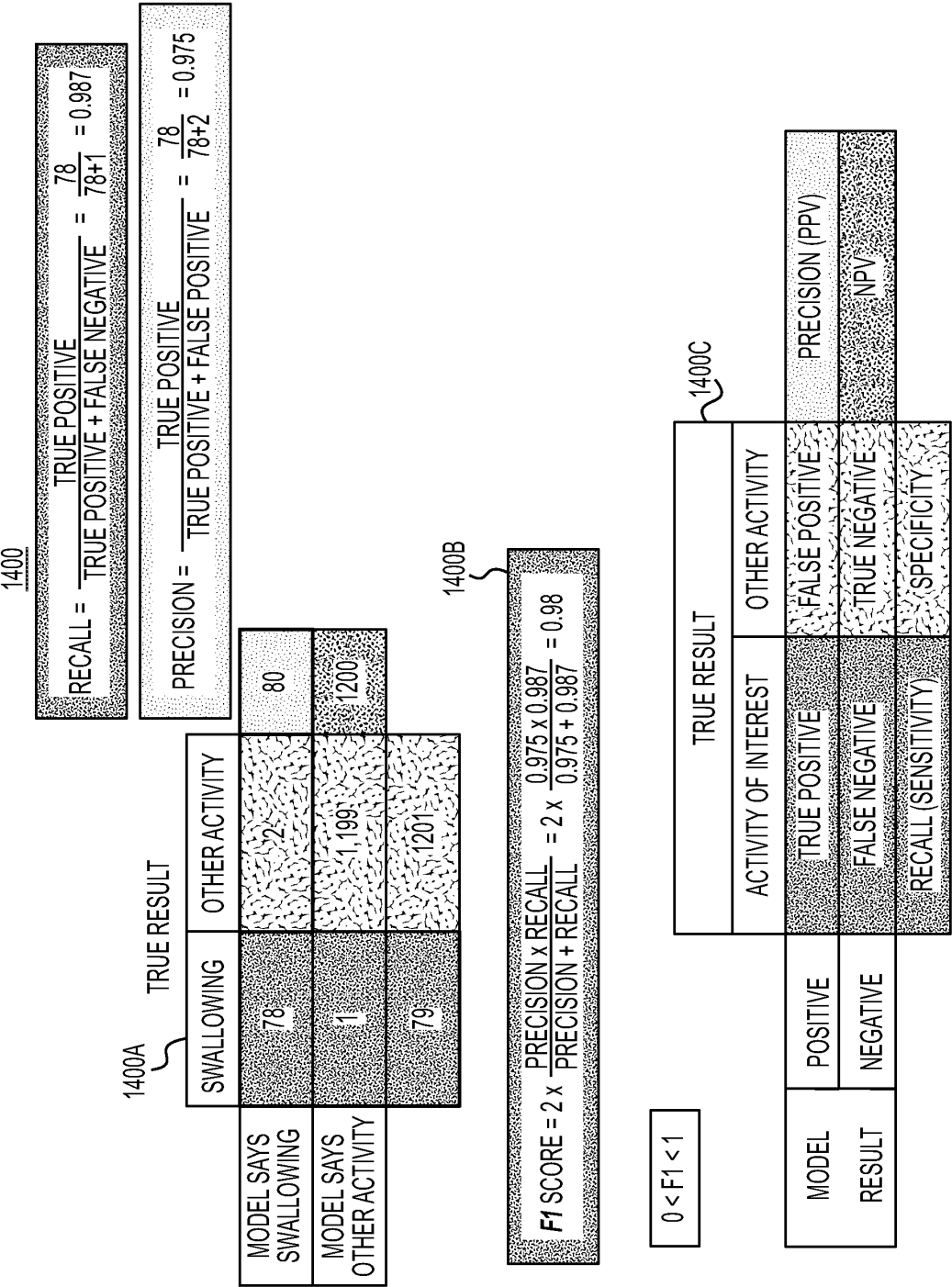


FIG. 14

FACIAL MOVEMENT ACTIVITY TASKS	ACTIVITY DETECTION F1 SCORE (MORNING)	ACTIVITY DETECTION F1 SCORE (EVENING)	ACTIVITY DETECTION F1 SCORE (OVERALL)
SWALLOWING	0.99	0.96	0.98
TALK	0.97	0.95	1
CHEWING	0.94	0.93	1
JAW	0.87	0.91	0.85
EYE	0.88	0.93	0.88
L-GAZER	0.71	0.78	0.83
UP GAZE	0.68	0.76	0.75
SMILE-ISO	0.77	0.74	0.7
L-GAZEL	0.74	0.67	0.79
IN-ISO	0.53	0.54	0.44
SURPRISE	0.53	0.45	0.31
OUT-ISO	0.29	0.55	0.17
SAD	0.56	0.52	0.24
ANGRY	0.40	0.44	0.22
WRINKLE-ISO	0.47	0.46	0.47
EYE-ISO	0.38	0.47	0.39

FIG. 15

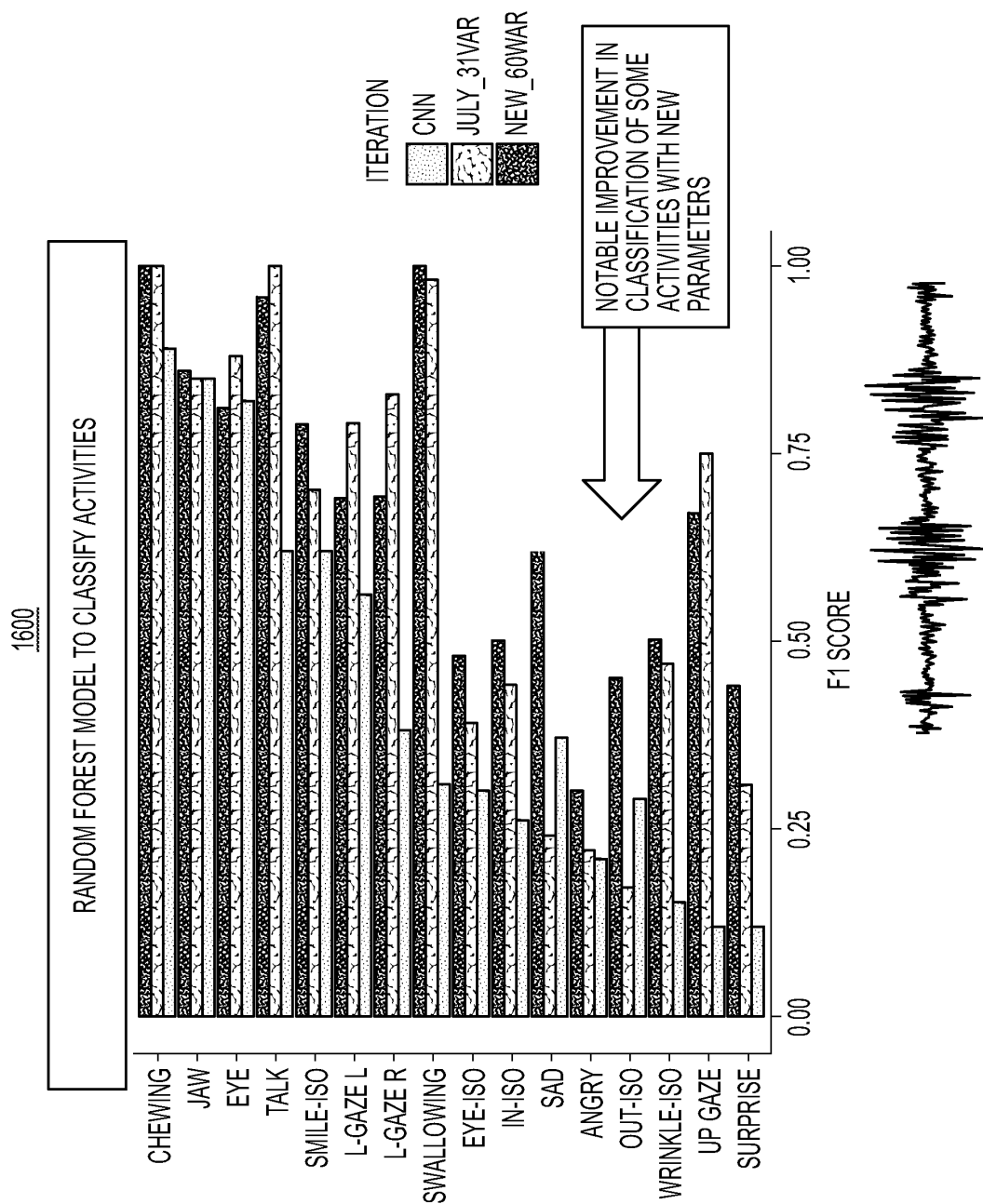


FIG. 16

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1700

ACTIVITY TYPE	MEAN SUBJECT RECOGNITION F1 SCORE(MORNING)	MEAN SUBJECT RECOGNITION F1 SCORE (EVENING)
ALL ACTIVITIES	0.79	0.78
CHEWING	0.88	0.90
TALK	0.89	0.85
L-GAZE L	0.79	0.78
UP GAZE	0.75	0.89
JAW	0.82	0.75
WRINKLE-ISO	0.88	0.70
SWALLOWING	0.75	0.82
L-GAZE R	0.83	0.69
SMILE-ISO	0.78	0.68
SUPRISE	0.85	0.80
EYE	0.65	0.73
OUT-ISO	0.73	0.88
EYE-ISO	0.70	0.70
IN-ISO	0.68	0.65
ANGRY	0.66	0.72
SAD	0.55	0.75

FIG. 17

ALGORITHM	METHODOLOGY	APPLICATION	ADVANTAGES	LIMITATIONS
RATIONAL DISCRETE SHORT-TIME FOURIER TRANSFORM (DSTFT)	BASED ON COMPLEX SINUSOIDAL BASIS FUNCTION WITHOUT WINDOW.	EPILEPTIC DETECTION (SEIZURE)	SIMPLE, FAST COMPUTATIONAL SPEED. GOOD FREQUENCY RESOLUTION.	APPLIED TO STATIONARY SIGNALS, POOR TIME RESOLUTION.
FOURIER TRANSFORM	FOURIER TRANSFORM APPLIED TO CONSECUTIVE TIME WINDOW INCLUDES MULTI RESOLUTION ANALYSIS(MRA), CONTINUOUS WAVELET TRANSFORM(CWT) AND DISCRETE WAVELET TRANSFORM(DWT)	BCI APPLICATION	FAST COMPUTATIONAL SPEED, GOOD LOCALIZATION.	FIXED WINDOW SIZE, CHALLENGE IN SELECTION OF WINDOW SIZE
DISCRETE WAVELET TRANSFORM WITH LINEAR CLASSIFIER	CONTINUOUS WAVELET TRANSFORM(CWT) AND DISCRETE WAVELET TRANSFORM(DWT)	EPILEPTIC DETECTION (SEIZURE)	FLEXIBLE WINDOW SIZE, BETTER TIME AND FREQUENCY RESOLUTION	SELECTION OF MOTHER WAVELET FUNCTION(MWF) SAME FOR ALL FREQUENCIES
GABOR WAVELET TRANSFORM	MODIFIED GABOR WAVELET TRANSFORM	EMOTION RECOGNITION	ADEQUATE TIME-FREQUENCY RESOLUTION FOR ANALYZING FREQUENCY COMPONENTS OF SLEEP EEG	NOT SPECIFIED
HJORTH PARAMETER	BASED ON SELECTION OF PRINCIPAL FREQUENCY BAND AND FISHER RATIO	BCI APPLICATIONS	CALCULATION OF ACTIVITY AND MOBILITY PARAMETERS, GOOD TIME RESOLUTION.	GOOD CLASSIFICATION ACCURACY
HILBERT-HUANG TRANSFORM (HHT)	COMBINATION OF EMPIRICAL MODE DECOMPOSITION (EMD) AND HILBERT SPECTRAL ANALYSIS (HSA)	EPILEPTIC SEIZURE DETECTION	FAST DIAGNOSIS, HIGH ACCURACY, GOOD SENSITIVITY AND SPECIFICITY.	MOSTLY APPLICABLE TO NARROW BAND SIGNALS.
SMOOTH WIGNER-VILLE DISTRIBUTION (SWVD)	BASED ON MCAULAY-QUATIERI SINUSOIDAL MODEL	EPILEPTIC SEIZURE DETECTION	HIGH QUALITY RESOLUTION AND FACILITATES THE EXTRACTION OF FEATURES, PERFORMS WELL FOR MULTI COMPONENT NONSTATIONARY SIGNALS	INFLUENCED BY CROSS TERM INTERFERENCE

FIG. 18

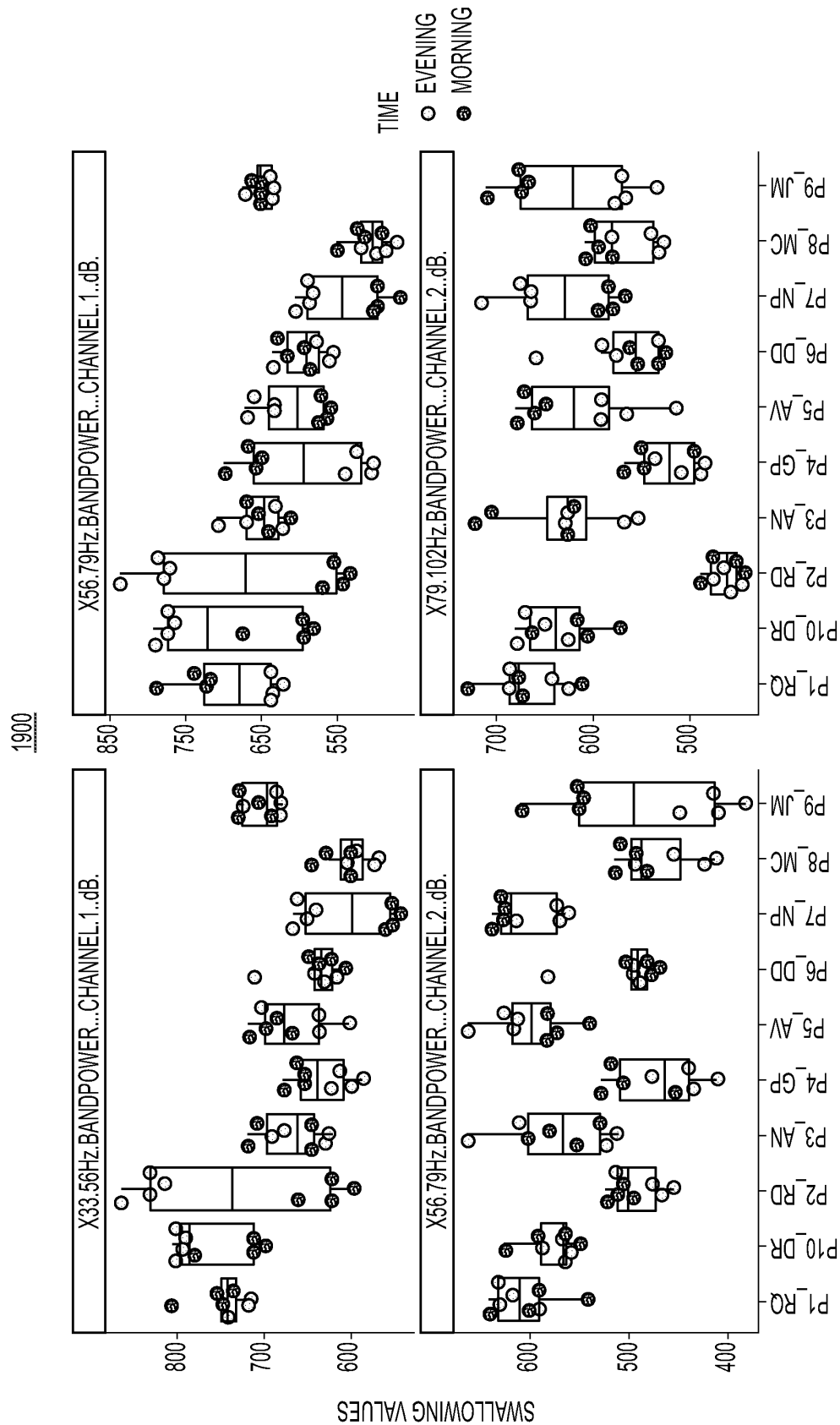


FIG. 19

2000

CLUSTER 1
PEAK.FREQUENCY.CONTRACTIONS...CHANNEL.1
PEAK.FREQUENCY.CONTRACTIONS...CHANNEL.2
APPROXIMATE.ENTROPY...CHANNEL.1
APPROXIMATE.ENTROPY...CHANNEL.2

CLUSTER 2
AMPLITUDE.SKEW...CHANNEL.1
AMPLITUDE.SKEW...CHANNEL.2

CLUSTER 3
PEAK.FREQUENCY.1...CHANNEL.1..Hz.
PEAK.FREQUENCY.2...CHANNEL.1..Hz.
PEAK.FREQUENCY.3...CHANNEL.1..Hz.
PEAK.FREQUENCY.4...CHANNEL.1..Hz.
PEAK.FREQUENCY.5...CHANNEL.1..Hz.
PEAK.FREQUENCY.1...CHANNEL.2..Hz.
PEAK.FREQUENCY.2...CHANNEL.2..Hz.
PEAK.FREQUENCY.3...CHANNEL.2..Hz.
PEAK.FREQUENCY.4...CHANNEL.2..Hz.
PEAK.FREQUENCY.5...CHANNEL.2..Hz.
ZERO.CROSSING.RATE...CHANNEL.1
ZERO.CROSSING.RATE...CHANNEL.2

CLUSTER 4
X90th.PERCENTILE.ABSOLUTE.AMPLITUDE...CHANNEL.1
X25th.PERCENTILE.ABSOLUTE.AMPLITUDE...CHANNEL.2
X50th.PERCENTILE.ABSOLUTE.AMPLITUDE...CHANNEL.2
X75th.PERCENTILE.ABSOLUTE.AMPLITUDE...CHANNEL.2
X90th.PERCENTILE.ABSOLUTE.AMPLITUDE...CHANNEL.2
ABSOLUTE.AMPLITUDE.STANDARD.DEVIATION...CHANNEL.1
ABSOLUTE.AMPLITUDE.STANDARD.DEVIATION...CHANNEL.2
ROOT.MEAN.SQUARE...CHANNEL.1
ROOT.MEAN.SQUARE...CHANNEL.2

CLUSTER 5
DETRENDED.FLUCTUATION.HURST.PARAMETER...CHANNEL.1
DETRENDED.FLUCTUATION.HURST.PARAMETER...CHANNEL.2
PETROSIAN.FRACTAL.DIMENSION...CHANNEL.1
PETROSIAN.FRACTAL.DIMENSION...CHANNEL.2

CLUSTER 6
AMPLITUDE.KURTOSIS...CHANNEL.1
AMPLITUDE.KURTOSIS...CHANNEL.2
SPECTRAL.ENTROPY...CHANNEL.1
SPECTRAL.ENTROPY...CHANNEL.2
EOG.INITIAL.DEFLECTION.CLIPPED...CHANNEL.1
EOG.INITIAL.DEFLECTION.CLIPPED...CHANNEL.2
EOG.DEFLECTION.SIGN...CHANNEL.1
EOG.DEFLECTION.SIGN...CHANNEL.2

CLUSTER 4
"MEAN.ABSOLUTE.AMPLITUDE...CHANNEL.1..u.V.
MEAN.ABSOLUTE.AMPLITUDE...CHANNEL.2..u.V.
MAX.ABSOLUTE.AMPLITUDE...CHANNEL.1..u.V.
MAX.ABSOLUTE.AMPLITUDE...CHANNEL.2..u.V.
X33.56.Hz.BANDPOWER...CHANNEL.1..dB.
X56.79.Hz.BANDPOWER...CHANNEL.1..dB.
X79.102.Hz.BANDPOWER...CHANNEL.1..dB.
X102.125.Hz.BANDPOWER...CHANNEL.1..dB.
X10.33.Hz.BANDPOWER...CHANNEL.2..dB.
X33.56.Hz.BANDPOWER...CHANNEL.2..dB.
X56.79.Hz.BANDPOWER...CHANNEL.2..dB.
X79.102.Hz.BANDPOWER...CHANNEL.2..dB.
X102.125.Hz.BANDPOWER...CHANNEL.2..dB.
VARIANCE...CHANNEL.1,"VARIANCE...CHANNEL.1
X25th.PERCENTILE.ABSOLUTE.AMPLITUDE...CHANNEL.1
X50th.PERCENTILE.ABSOLUTE.AMPLITUDE...CHANNEL.1
X75th.PERCENTILE.ABSOLUTE.AMPLITUDE...CHANNEL.1

FIG. 20

2100

OTHER		
EVENT.DURATION.s.		s
PERCEPTIBLE.ONSET.TIME.s.		s

AMPLITUDE	
MEAN.ABSOLUTE.AMPLITUDE...CHANNEL.1..u.V.	uV
MEAN.ABSOLUTE.AMPLITUDE...CHANNEL.2..u.V.	uV
MAX.ABSOLUTE.AMPLITUDE...CHANNEL.1..u.V.	uV
MAX.ABSOLUTE.AMPLITUDE...CHANNEL.2..u.V.	uV
AMPLITUDE.KURTOSIS...CHANNEL.1	
AMPLITUDE.KURTOSIS...CHANNEL.2	
AMPLITUDE.SKEW...CHANNEL.1	
AMPLITUDE.SKEW...CHANNEL.2	

FREQUENCY	
PEAK.FREQUENCY.1...CHANNEL.1..Hz.	Hz
PEAK.FREQUENCY.2...CHANNEL.1..Hz.	Hz
PEAK.FREQUENCY.3...CHANNEL.1..Hz.	Hz
PEAK.FREQUENCY.4...CHANNEL.1..Hz.	Hz
PEAK.FREQUENCY.5...CHANNEL.1..Hz.	Hz
PEAK.FREQUENCY.1...CHANNEL.2..Hz.	Hz
PEAK.FREQUENCY.2...CHANNEL.2..Hz.	Hz
PEAK.FREQUENCY.3...CHANNEL.2..Hz.	Hz
PEAK.FREQUENCY.4...CHANNEL.2..Hz.	Hz
PEAK.FREQUENCY.5...CHANNEL.2..Hz.	Hz
PEAK.FREQUENCY.CONTRACTIONS...CHANNEL.1	
PEAK.FREQUENCY.CONTRACTIONS...CHANNEL.2	

BANDPOWER	
X10.33Hz.BANDPOWER...CHANNEL.1..dB.	dB
X33.56Hz.BANDPOWER...CHANNEL.1..dB.	dB
X56.79Hz.BANDPOWER...CHANNEL.1..dB.	dB
X79.102Hz.BANDPOWER...CHANNEL.1..dB.	dB
X102.125Hz.BANDPOWER...CHANNEL.1..dB.	dB
X10.33Hz.BANDPOWER...CHANNEL.2..dB.	dB
X33.56Hz.BANDPOWER...CHANNEL.2..dB.	dB
X56.79Hz.BANDPOWER...CHANNEL.2..dB.	dB
X79.102Hz.BANDPOWER...CHANNEL.2..dB.	dB
X102.125Hz.BANDPOWER...CHANNEL.2..dB.	dB

FIG. 21

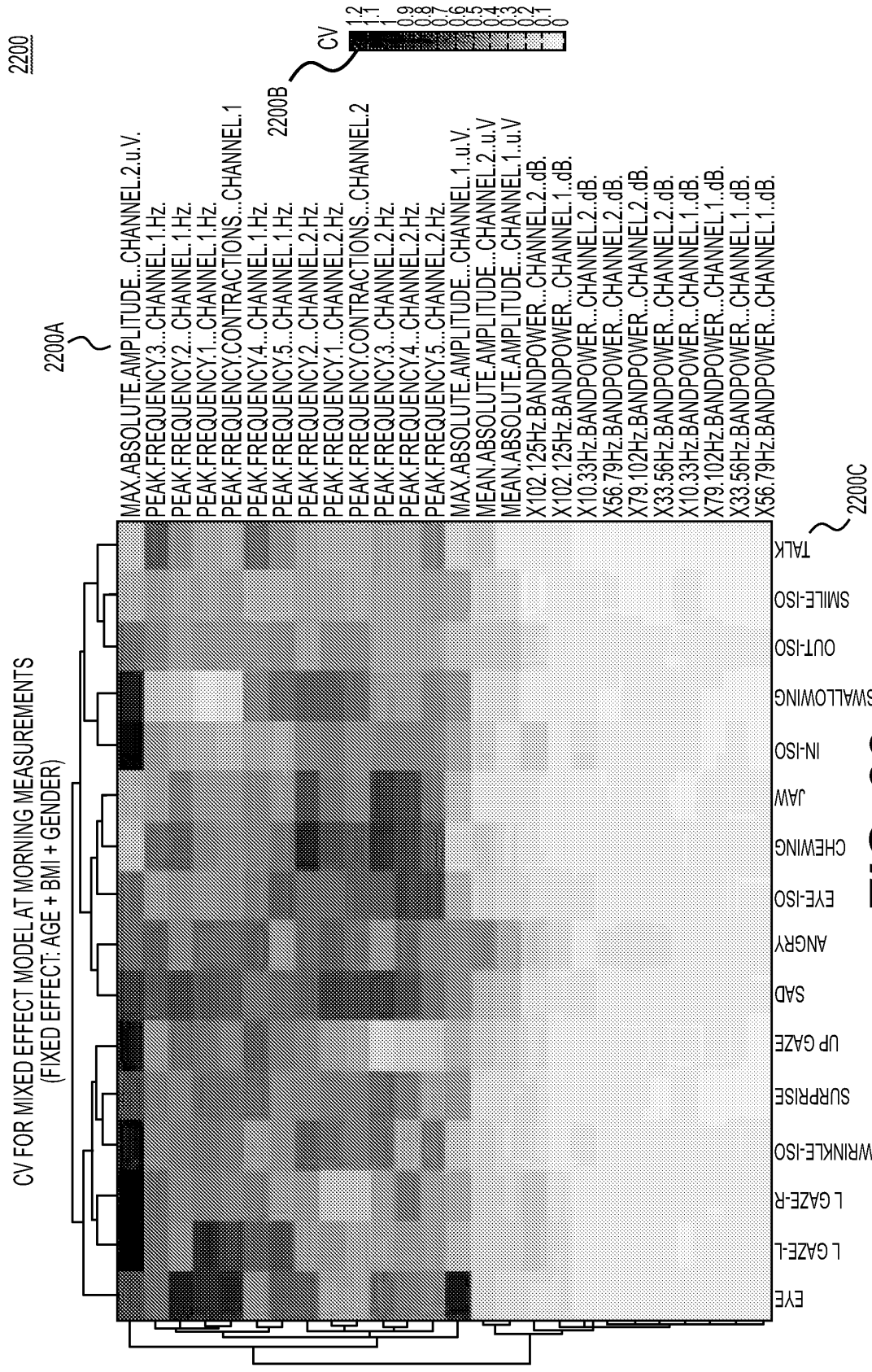


FIG. 22

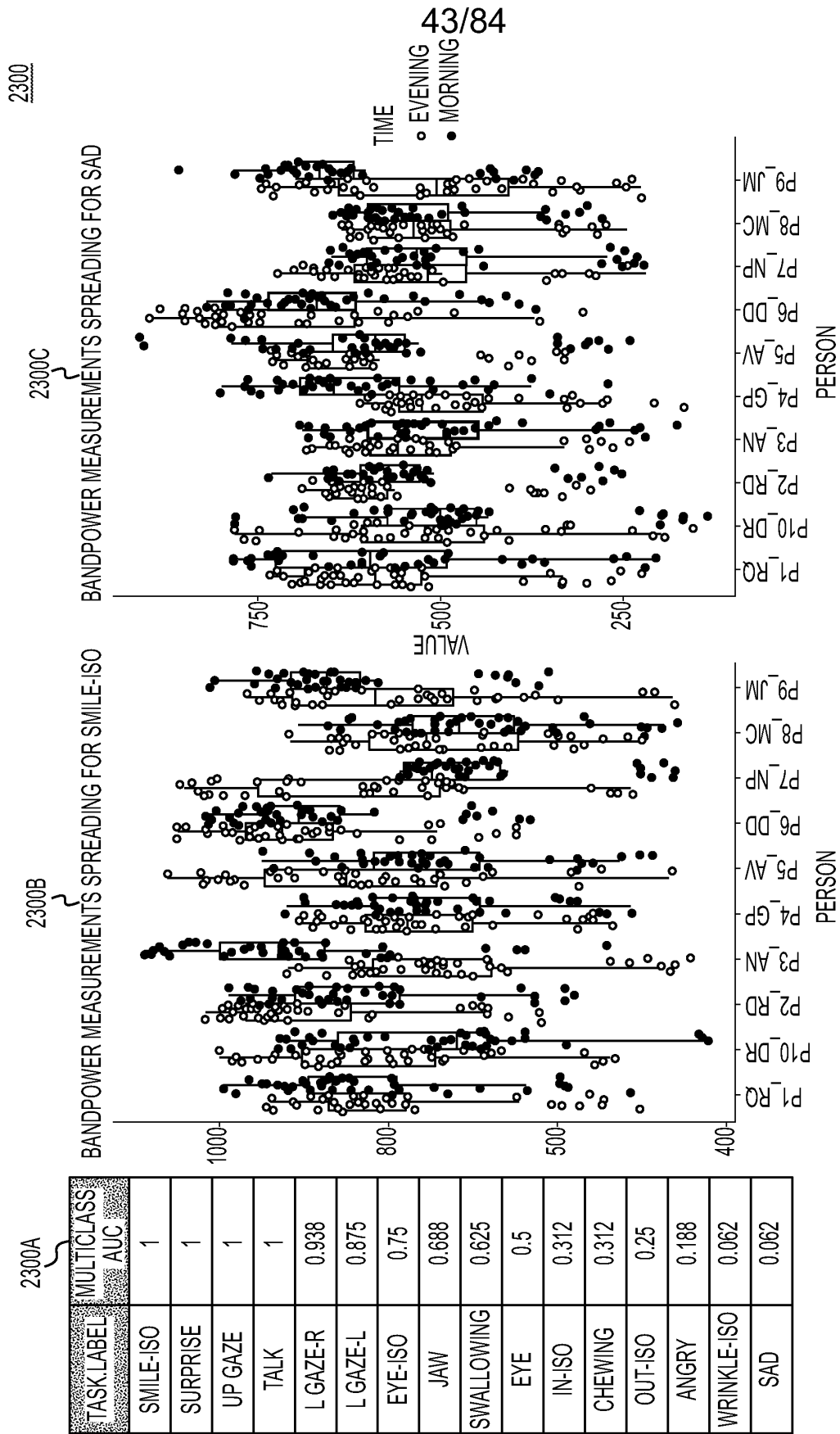


FIG. 23

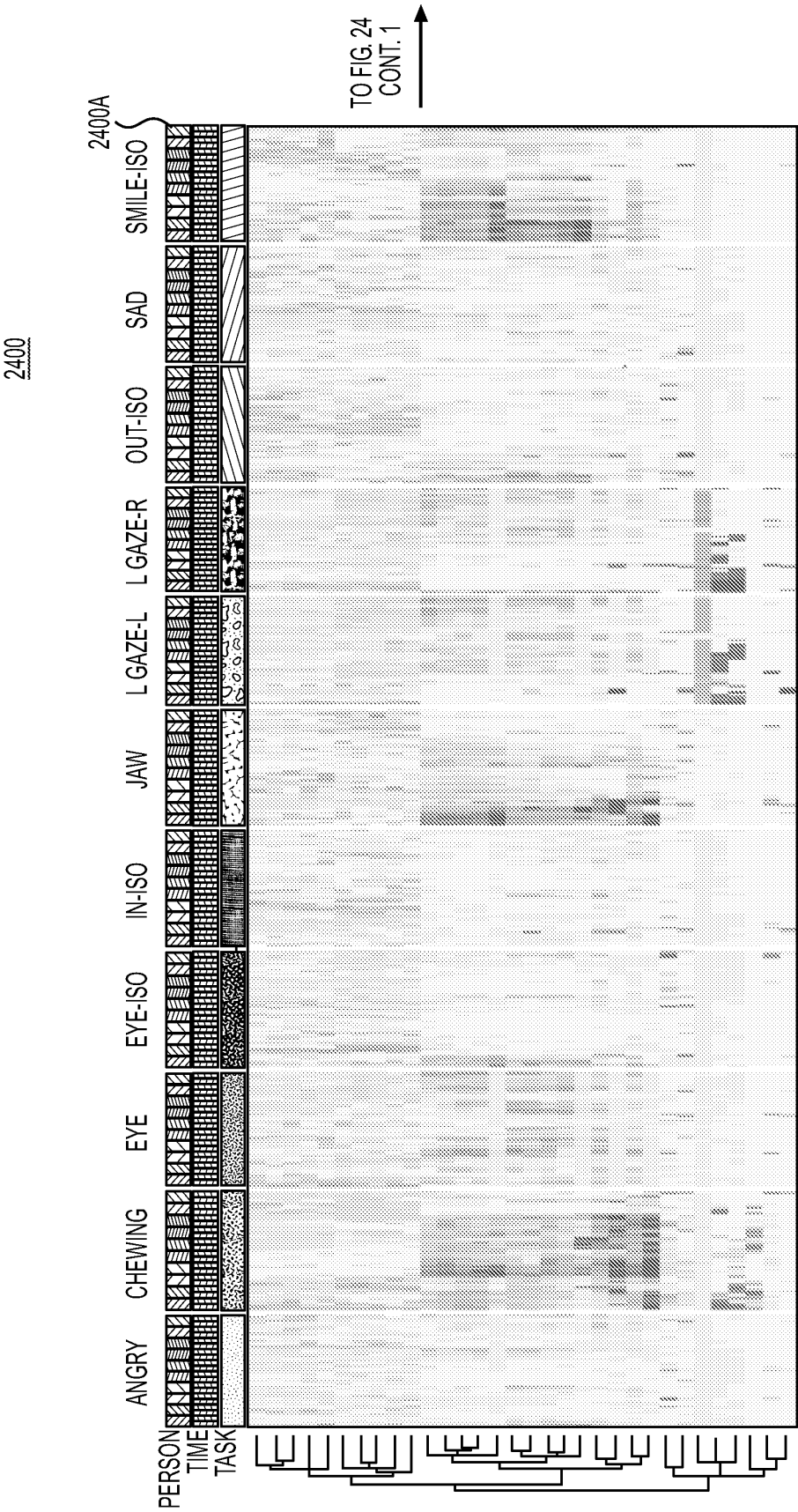


FIG. 24

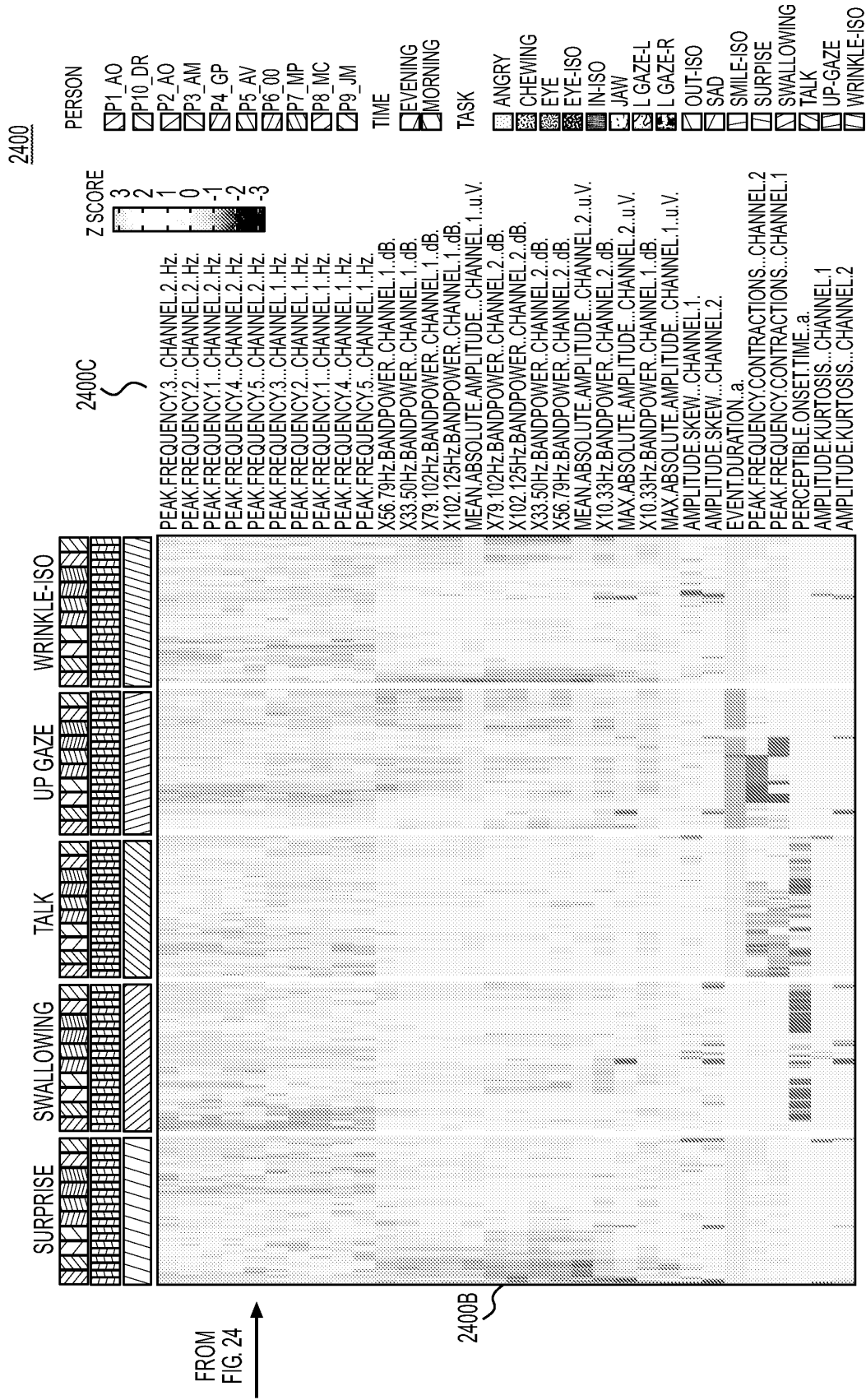


FIG. 24 (CONT. 1)

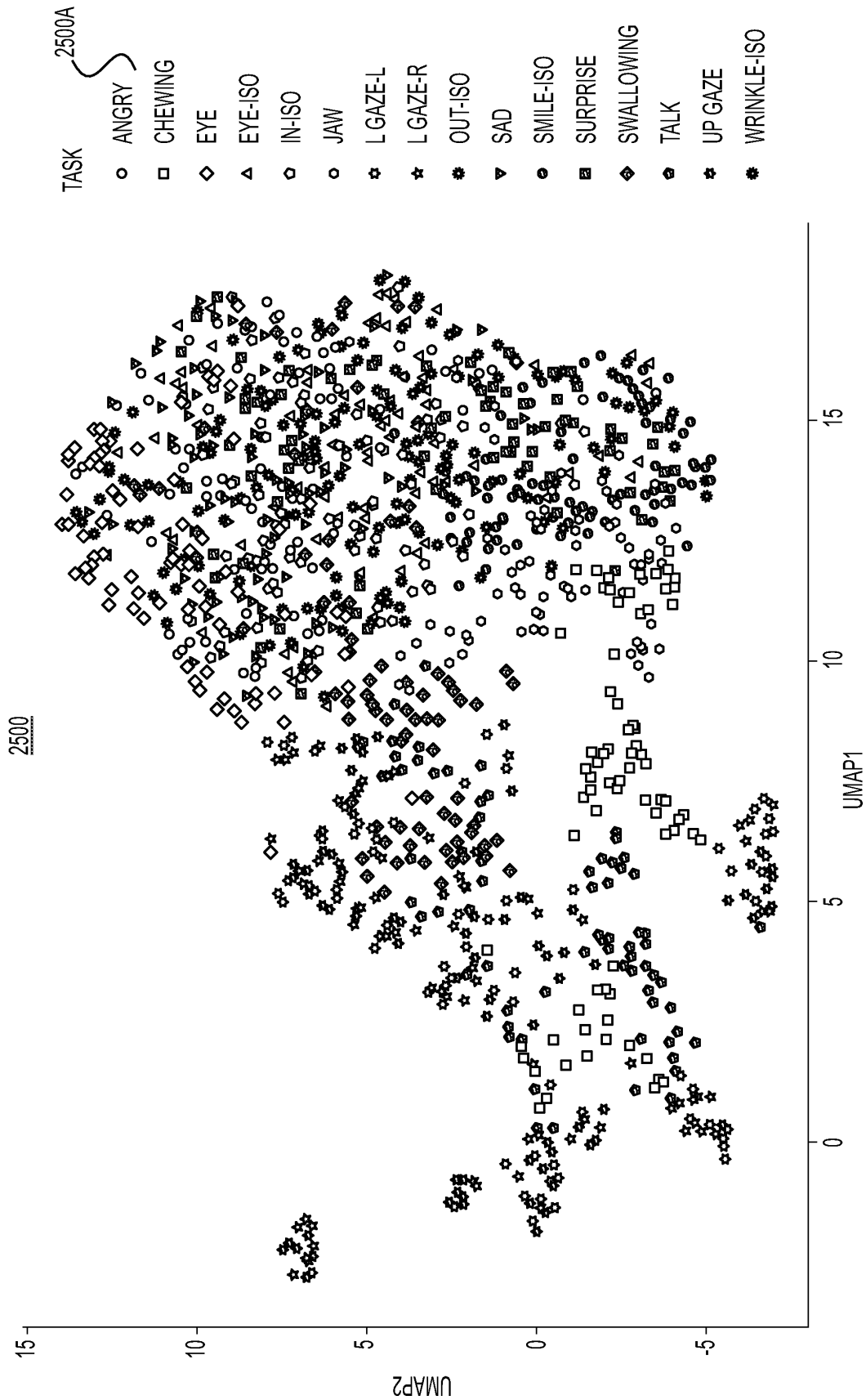


FIG. 25

2600

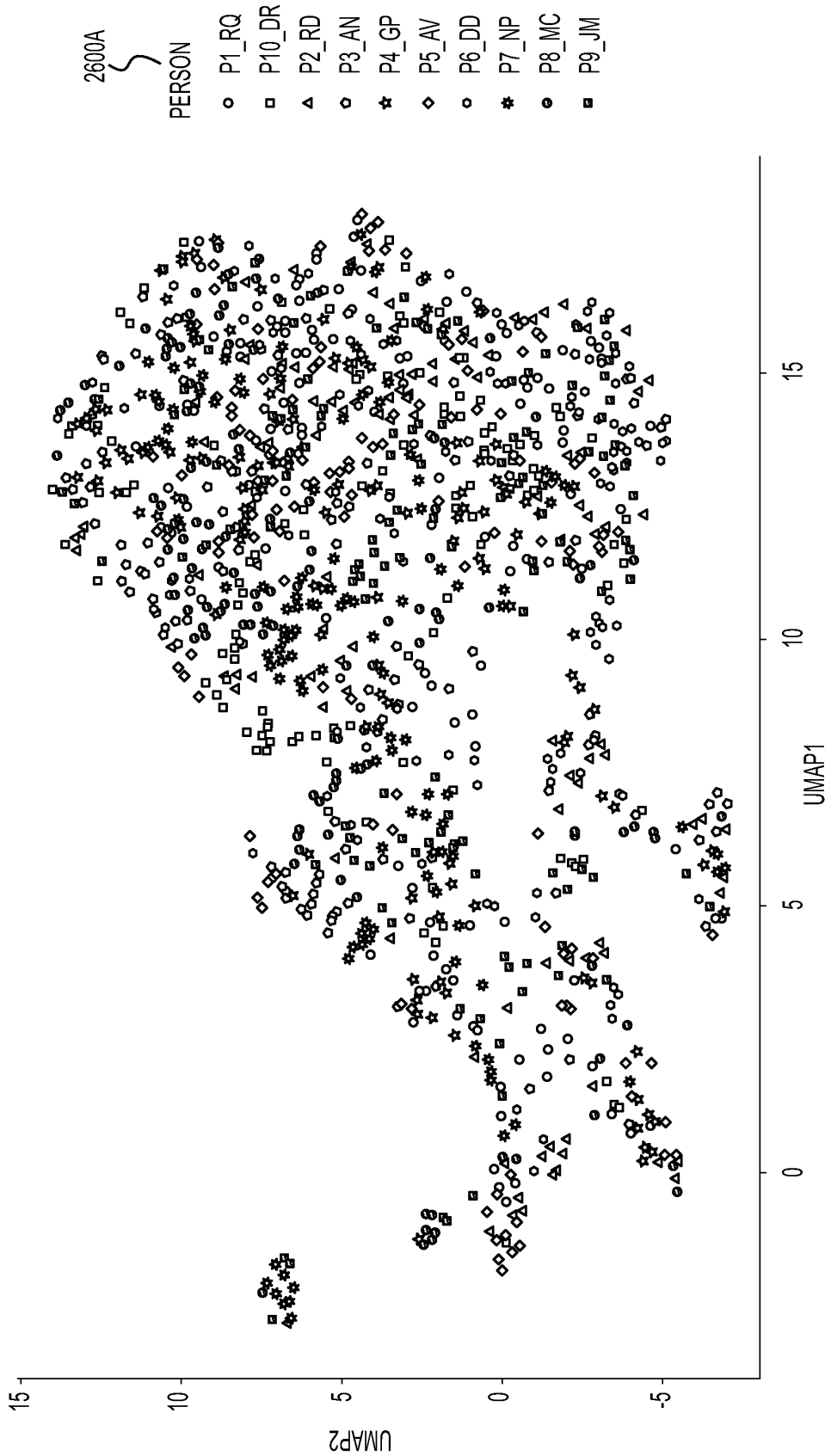


FIG. 26

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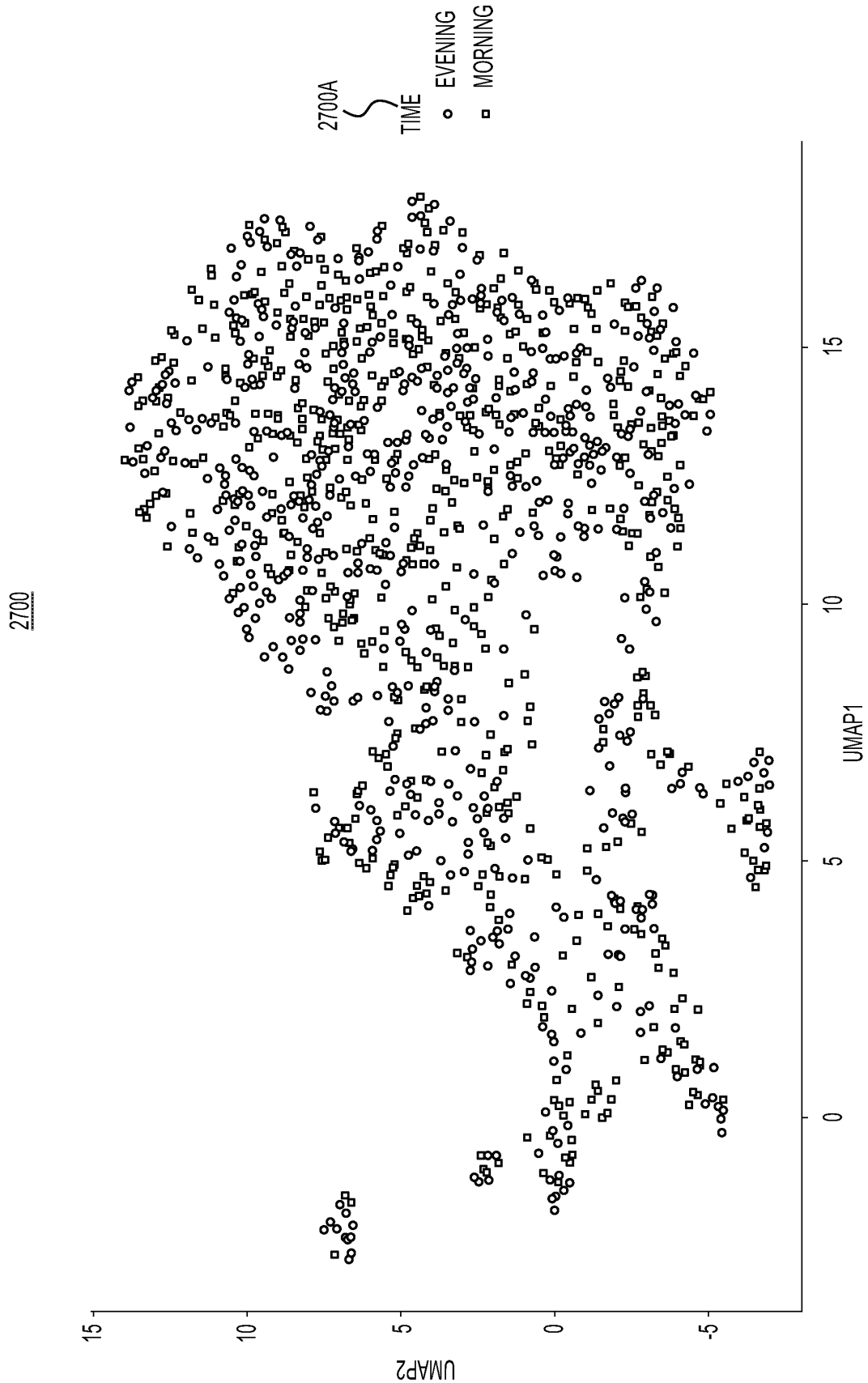
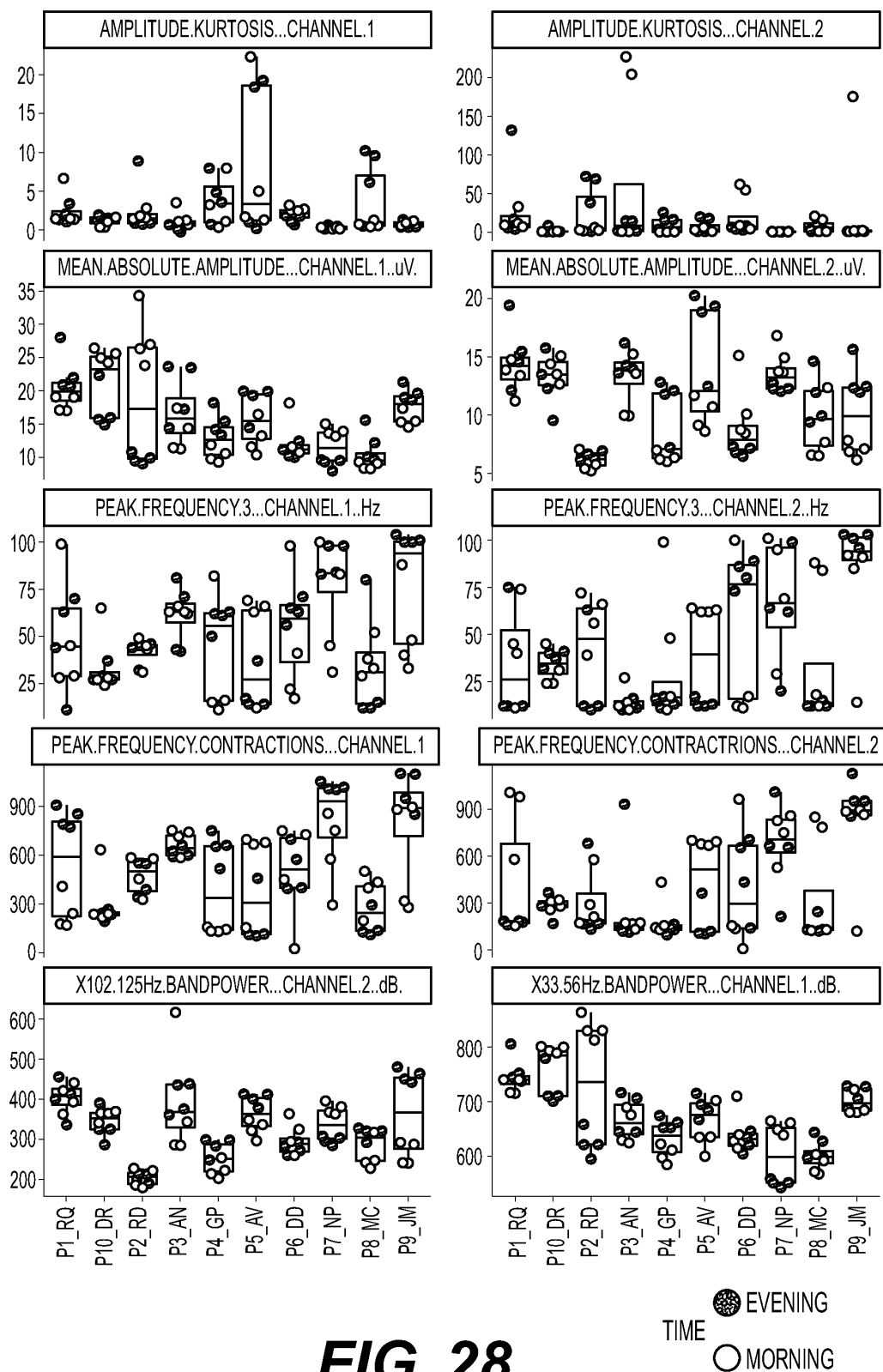
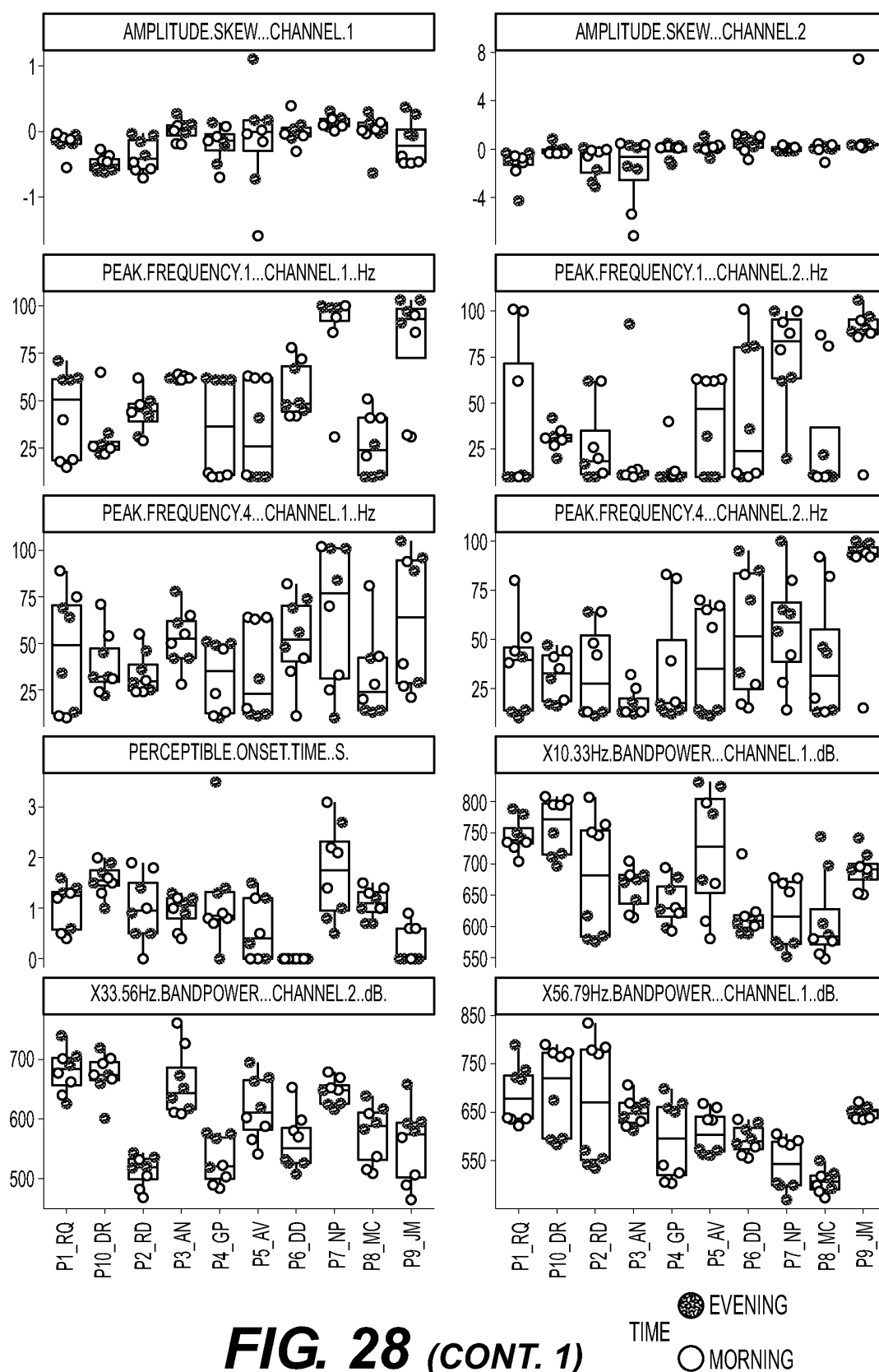


FIG. 27

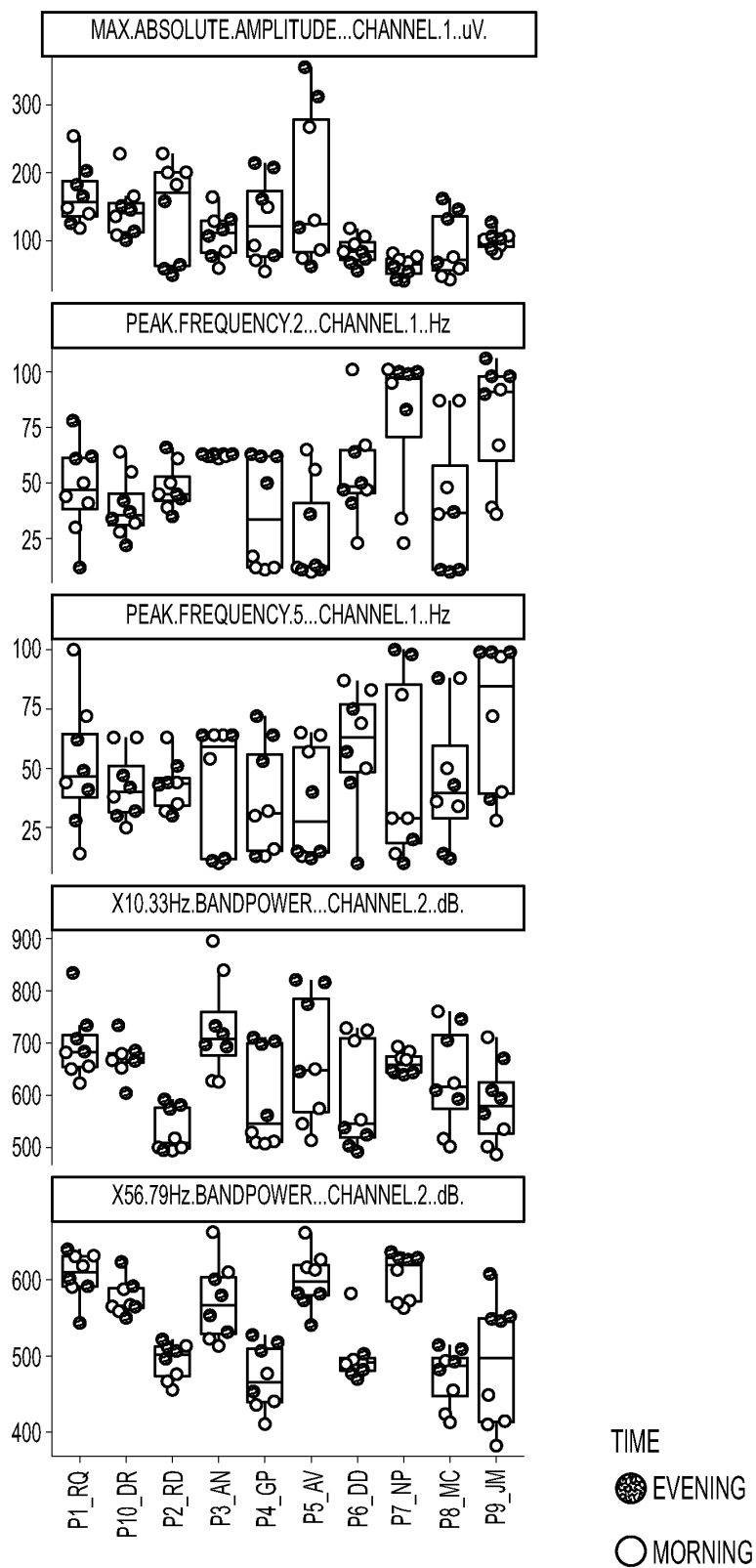
**FIG. 28**

SUBSTITUTE SHEET (RULE 26)

**FIG. 28 (CONT. 1)**

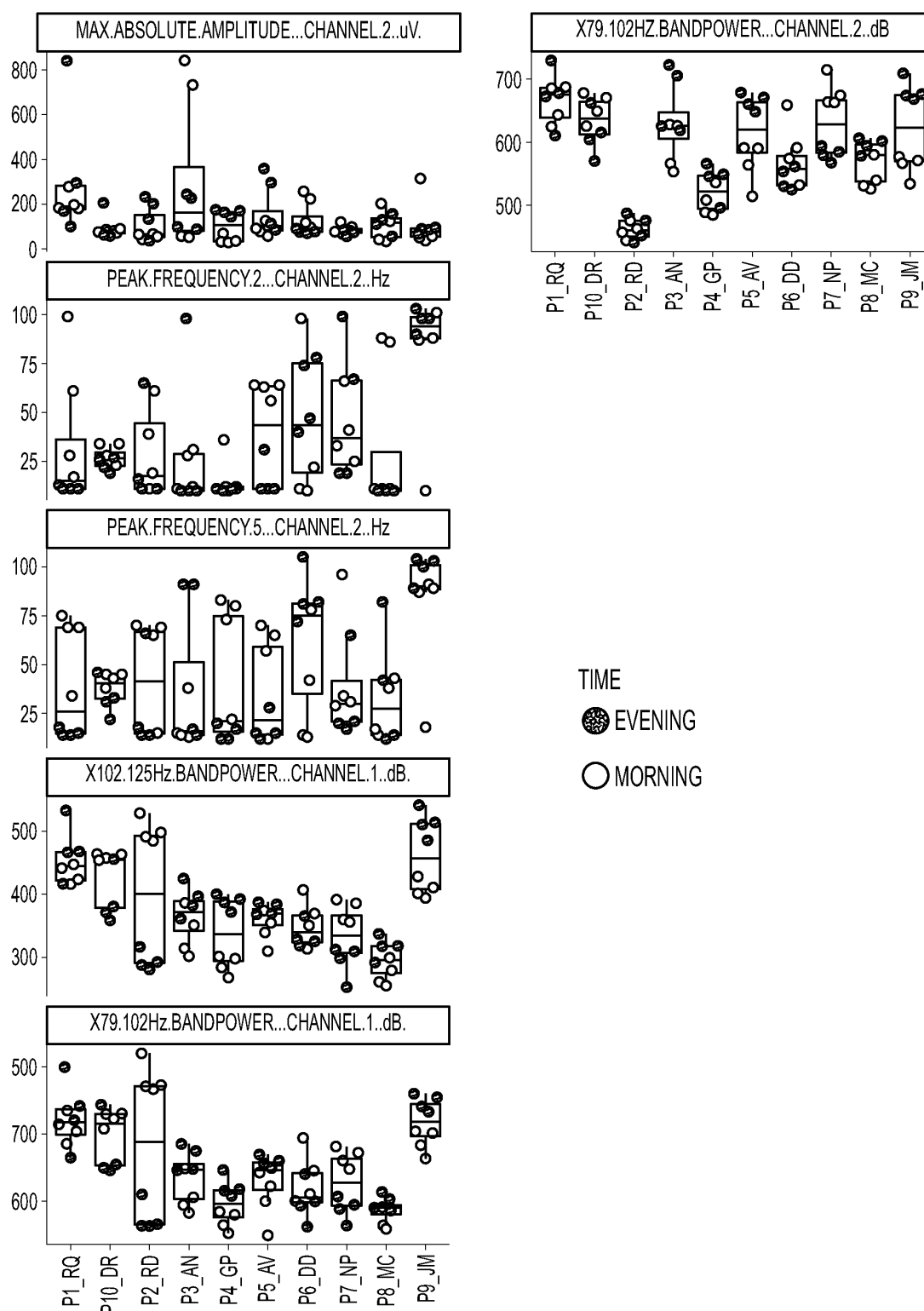
SUBSTITUTE SHEET (RULE 26)

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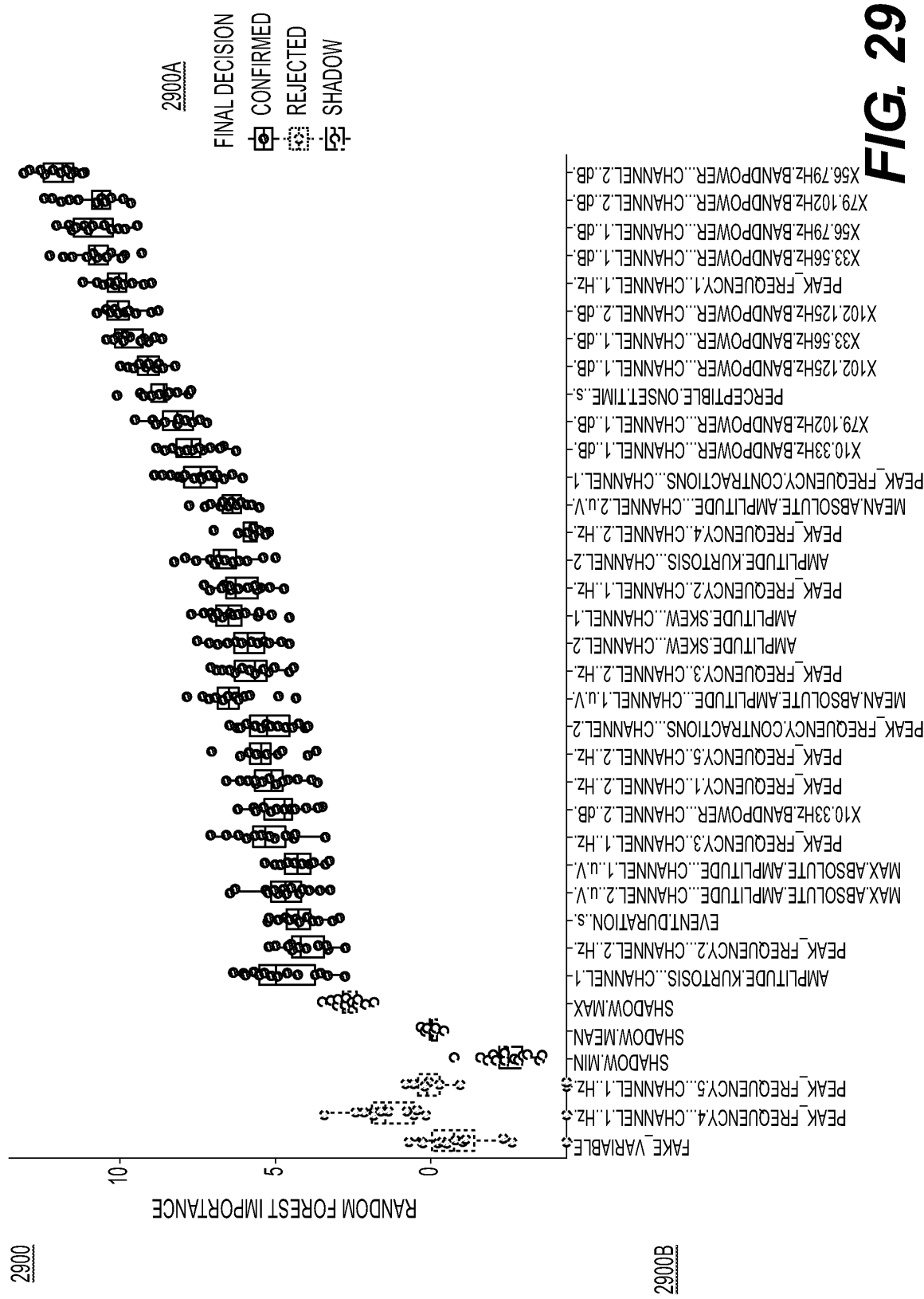
**FIG. 28 (CONT. 2)**

SUBSTITUTE SHEET (RULE 26)

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**FIG. 28 (CONT. 3)**

SUBSTITUTE SHEET (RULE 26)



3000

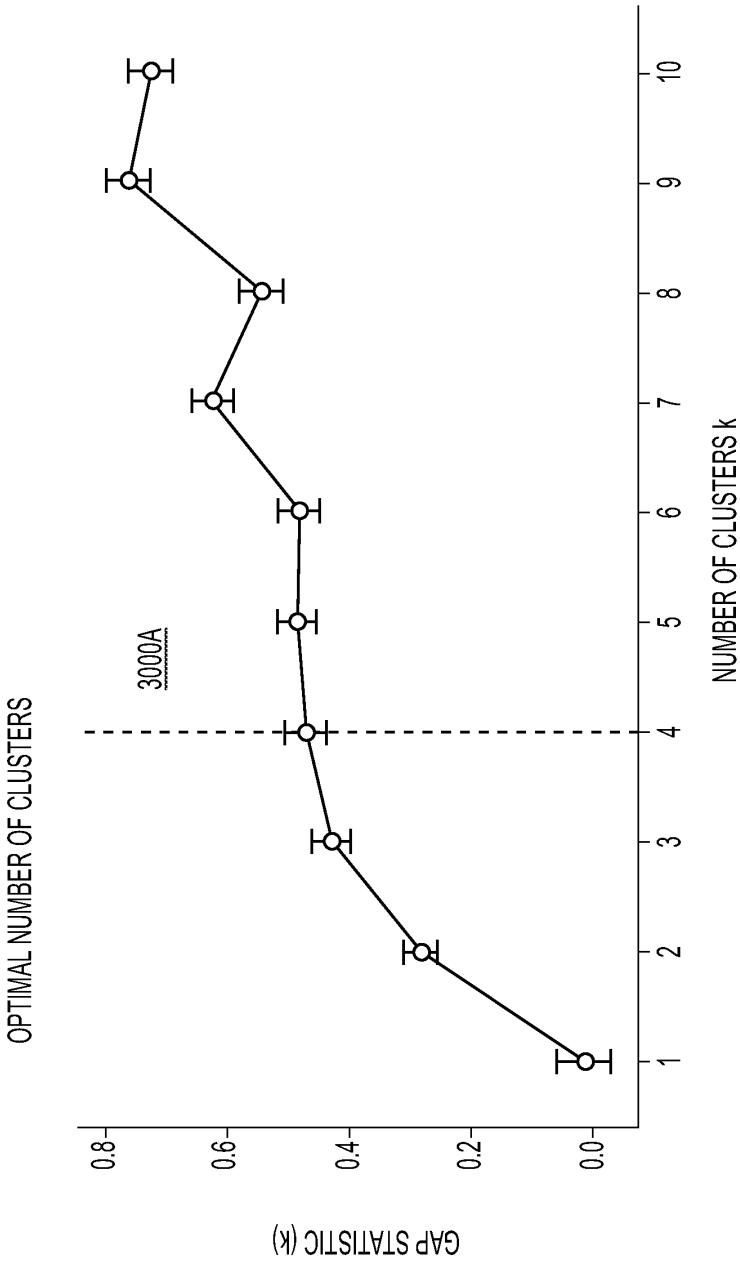


FIG. 30

3100

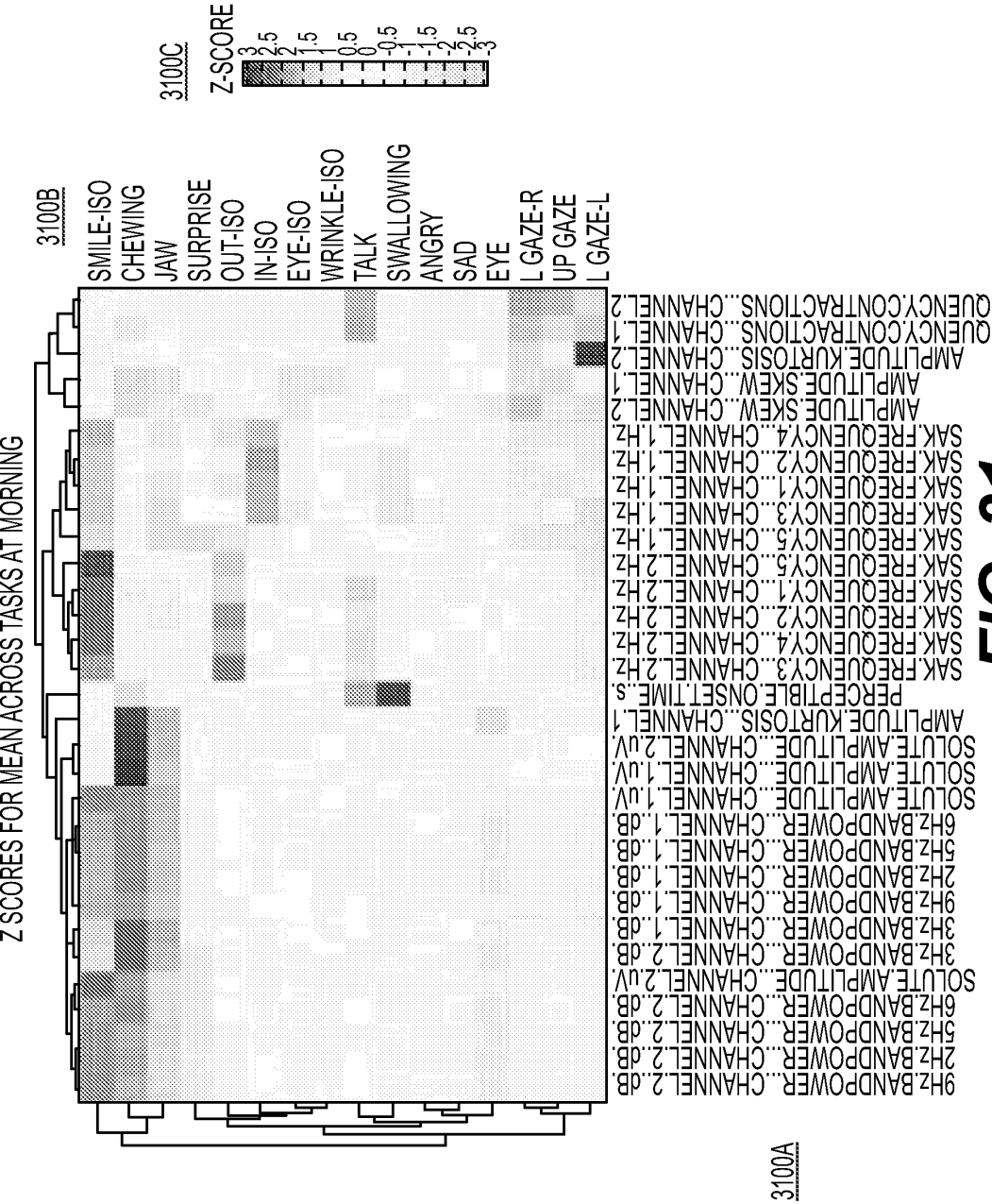
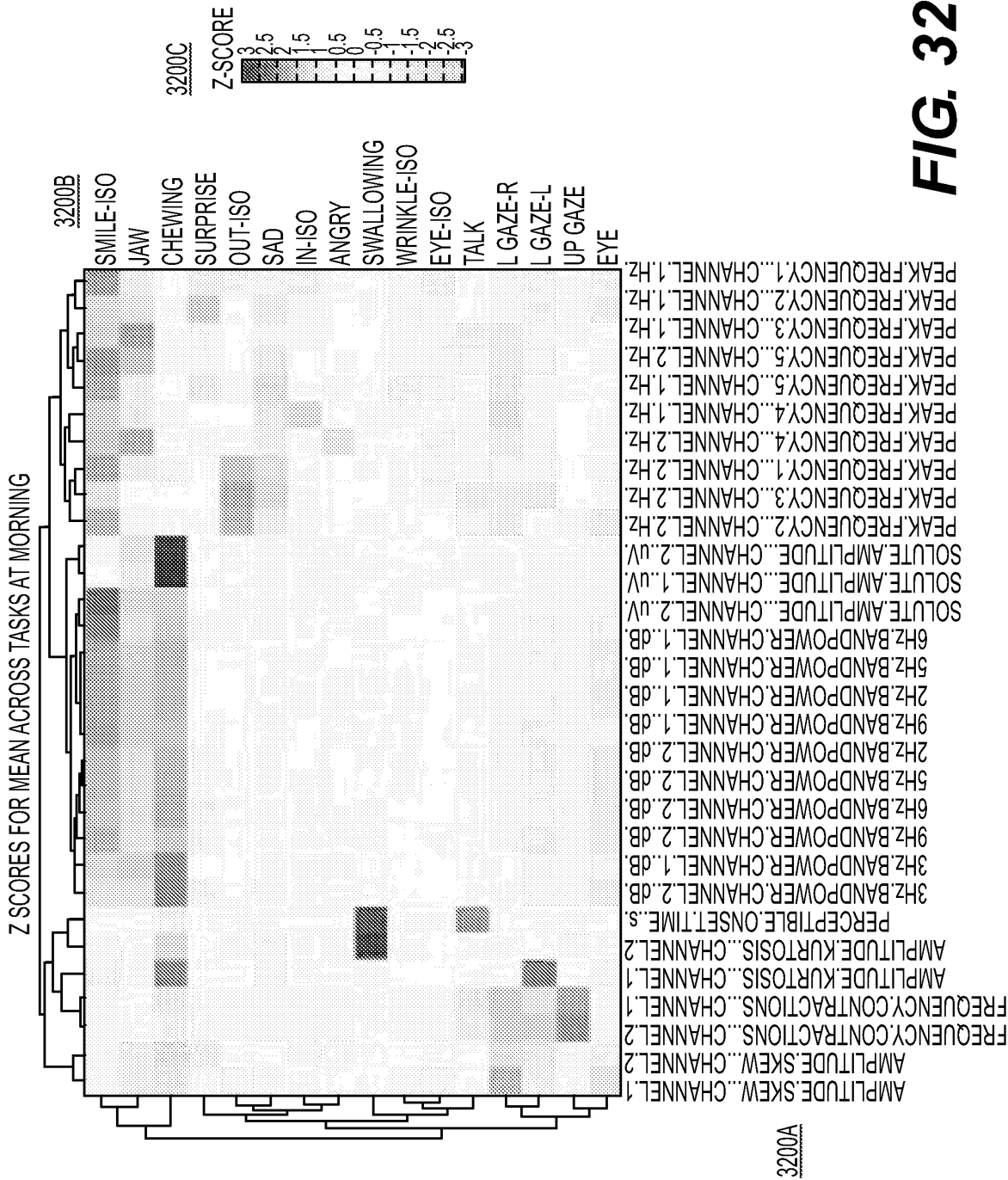
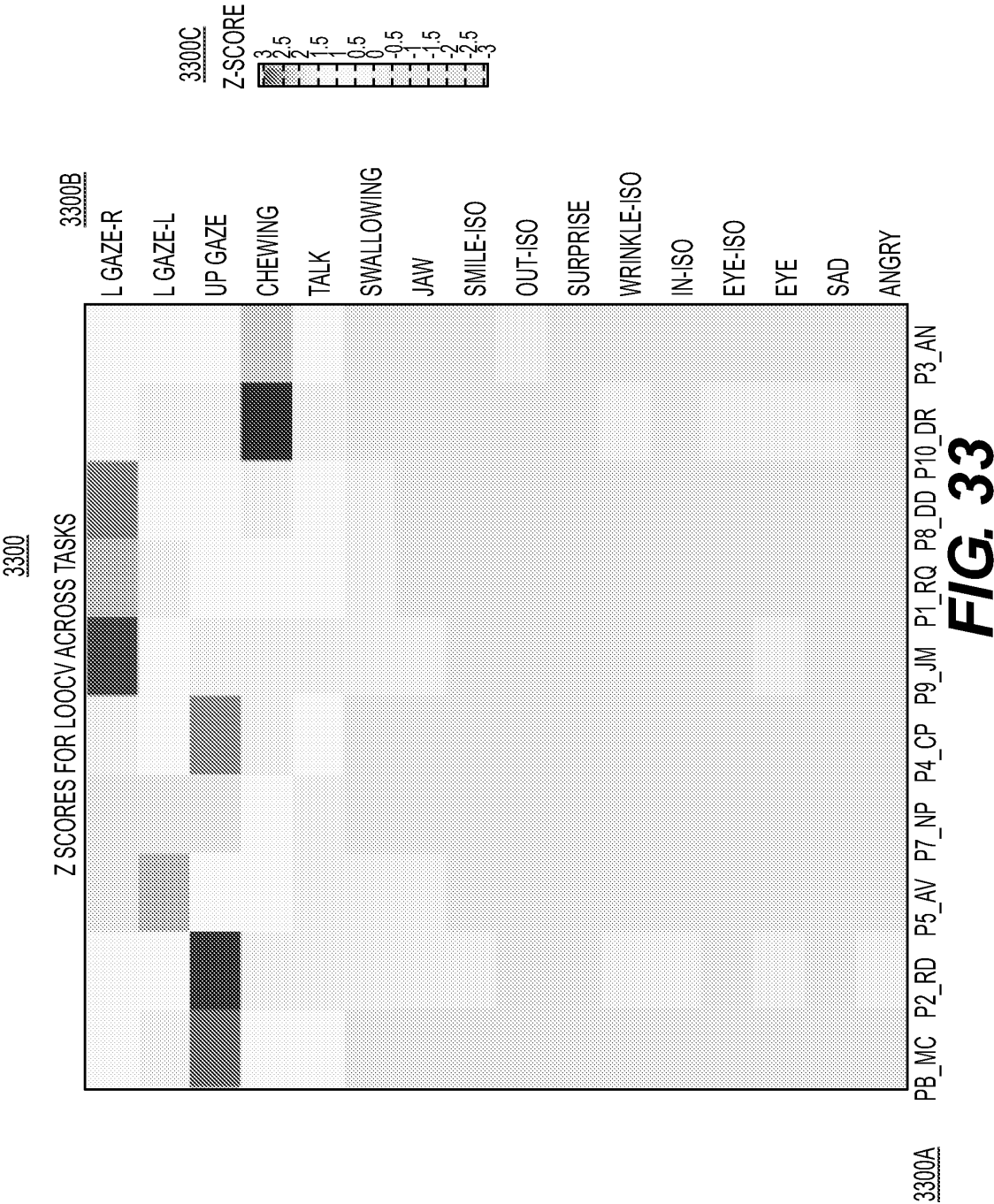


FIG. 31

3200





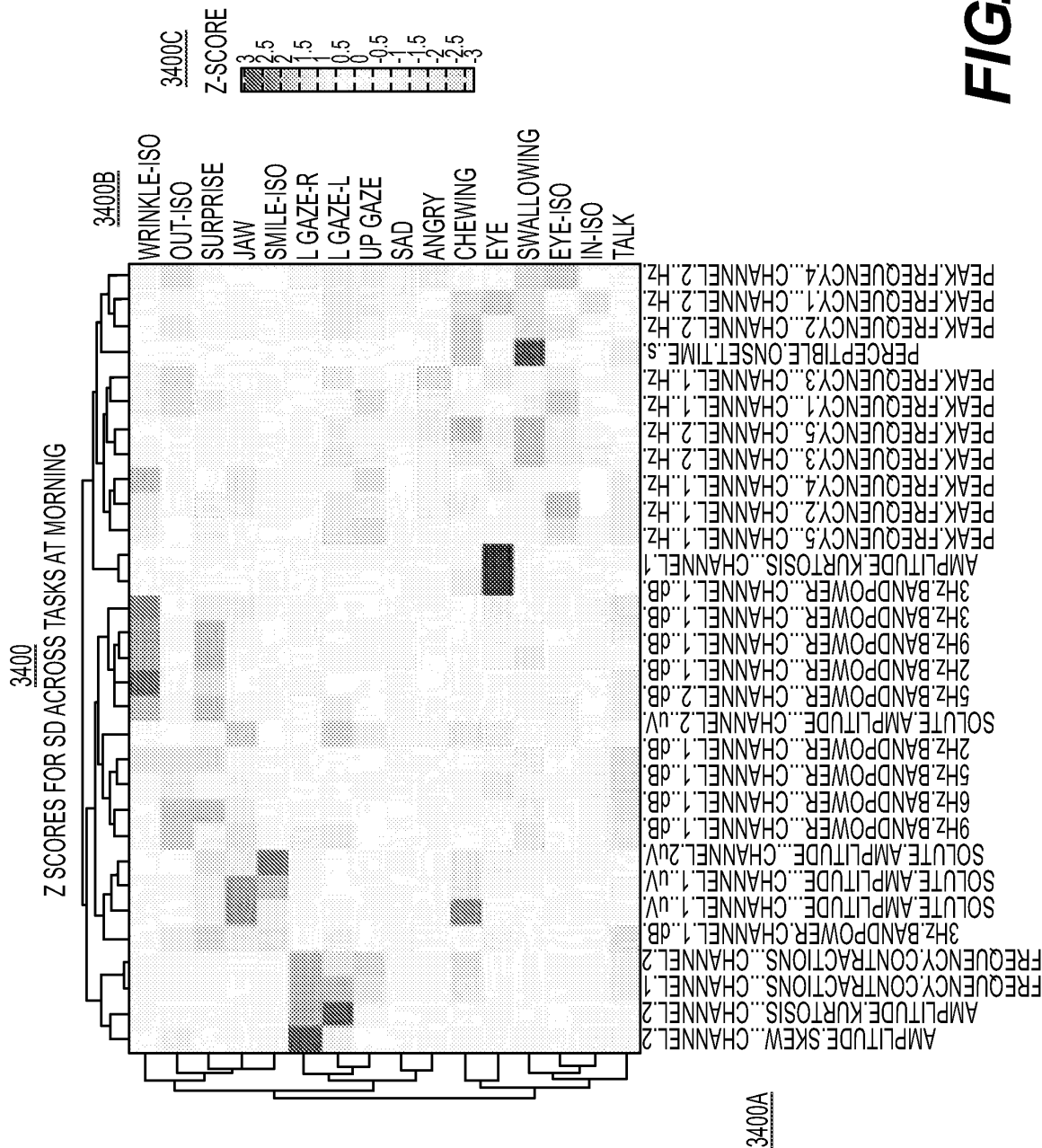


FIG. 34

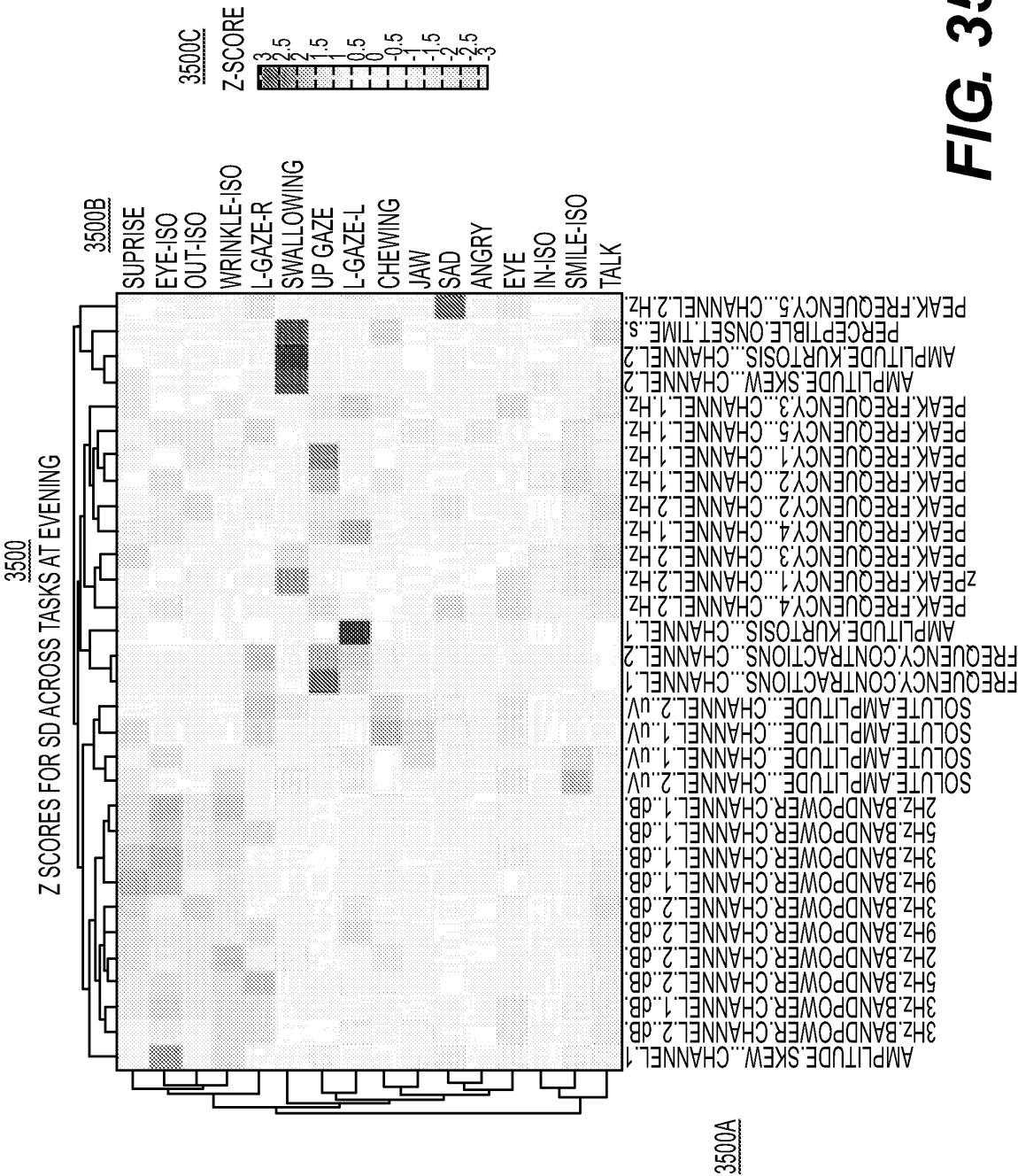


FIG. 35

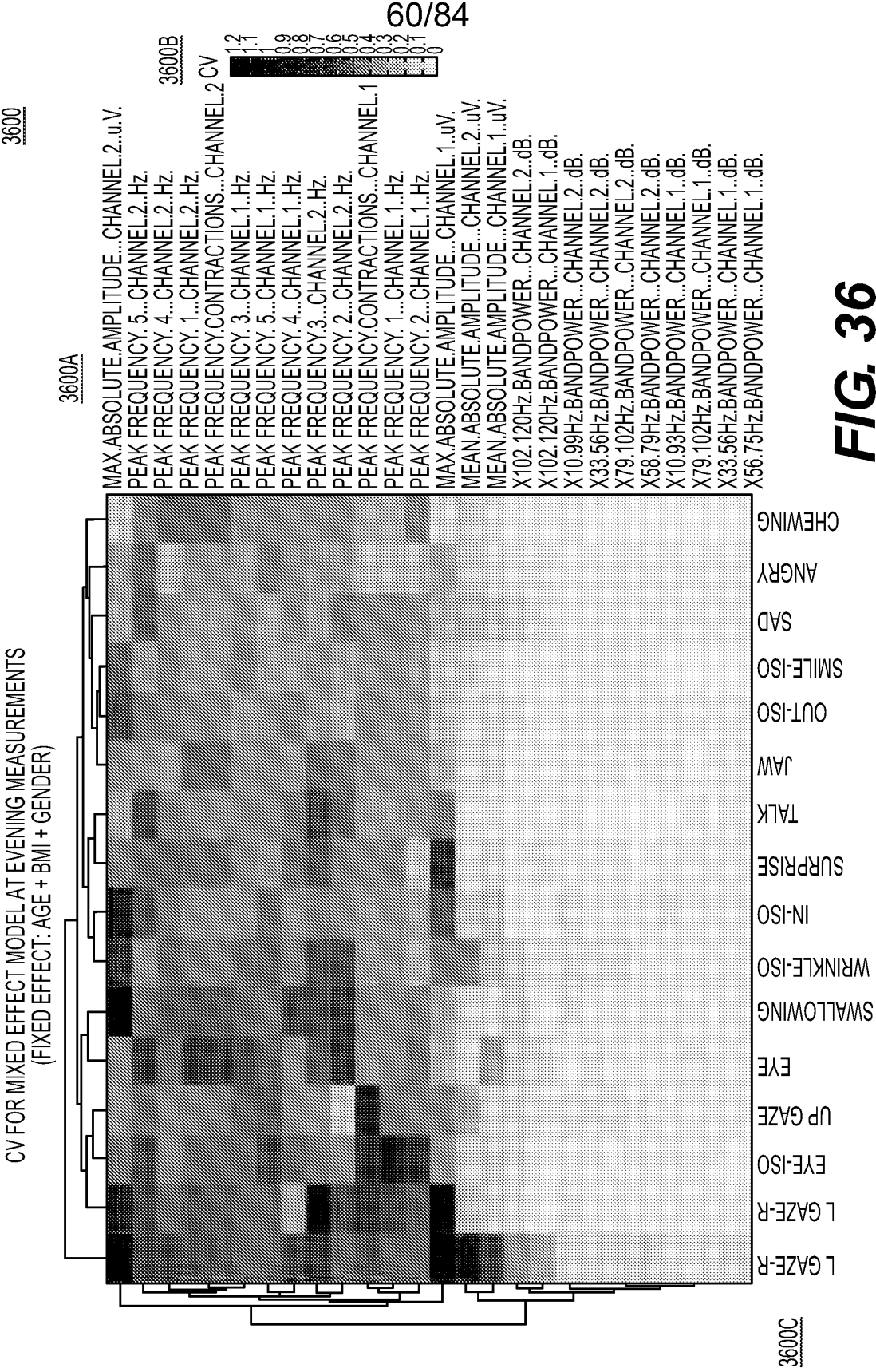
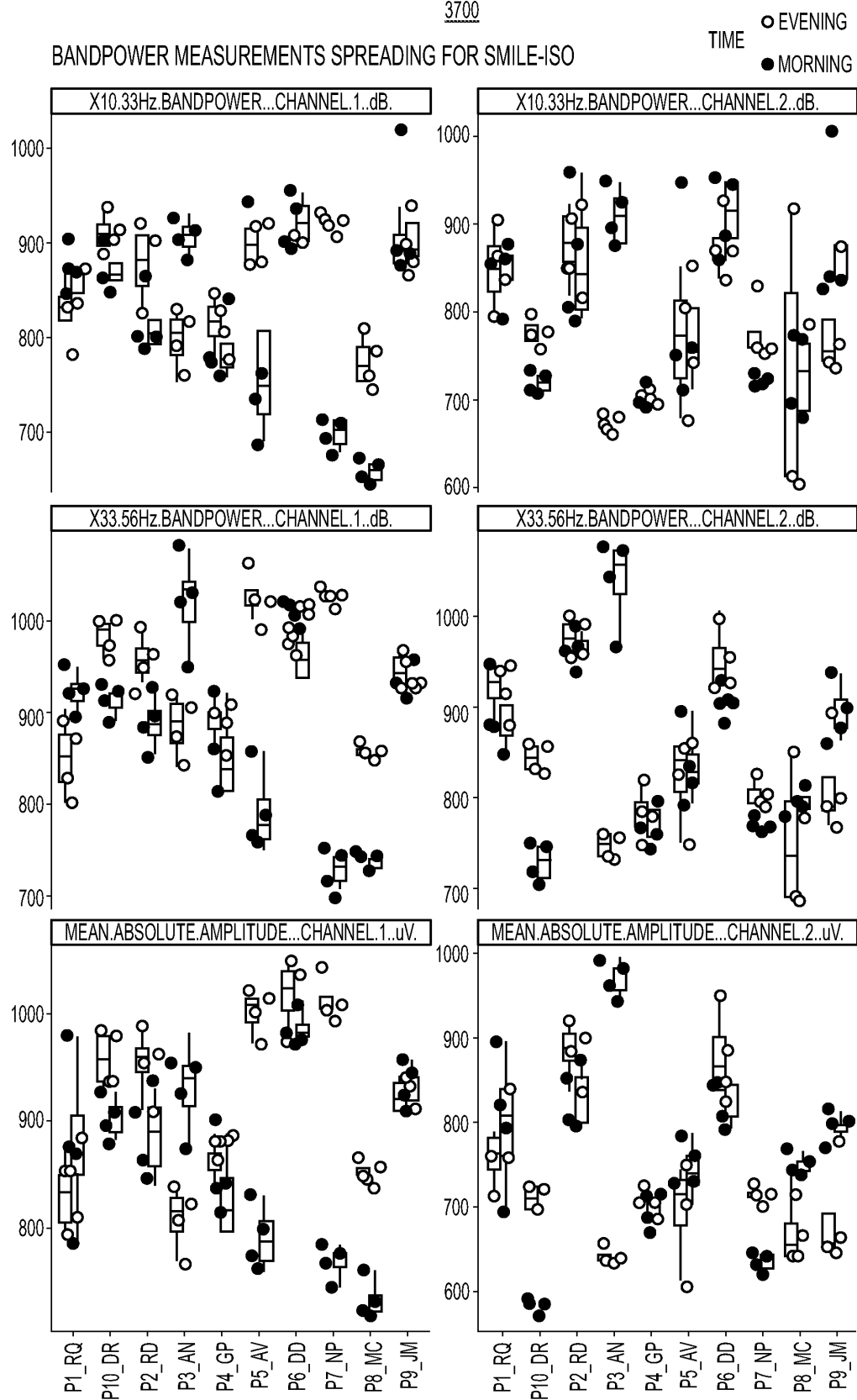


FIG. 36

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3700

**FIG. 37**

SUBSTITUTE SHEET (RULE 26)

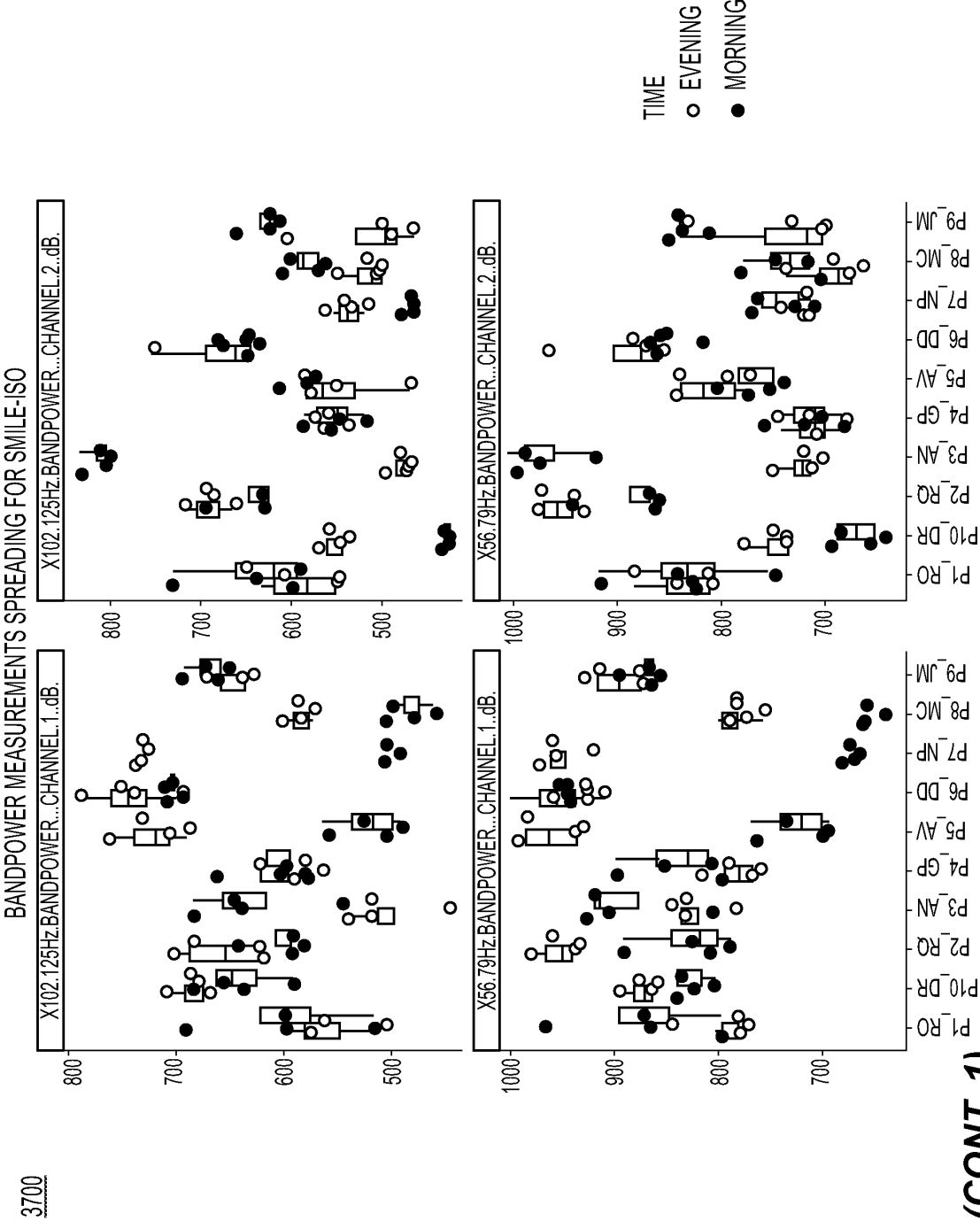


FIG. 37 (CONT. 1)

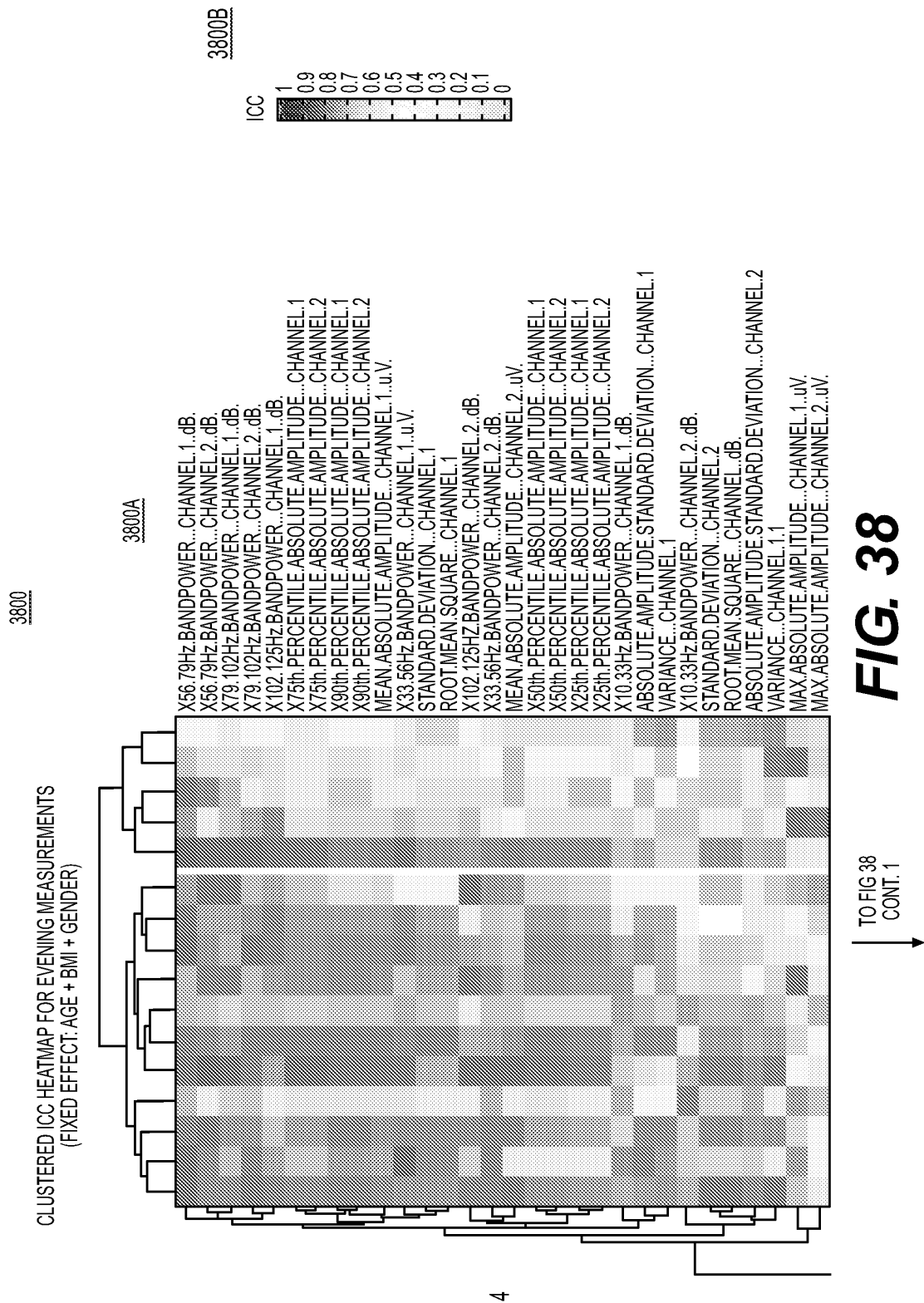


FIG. 38

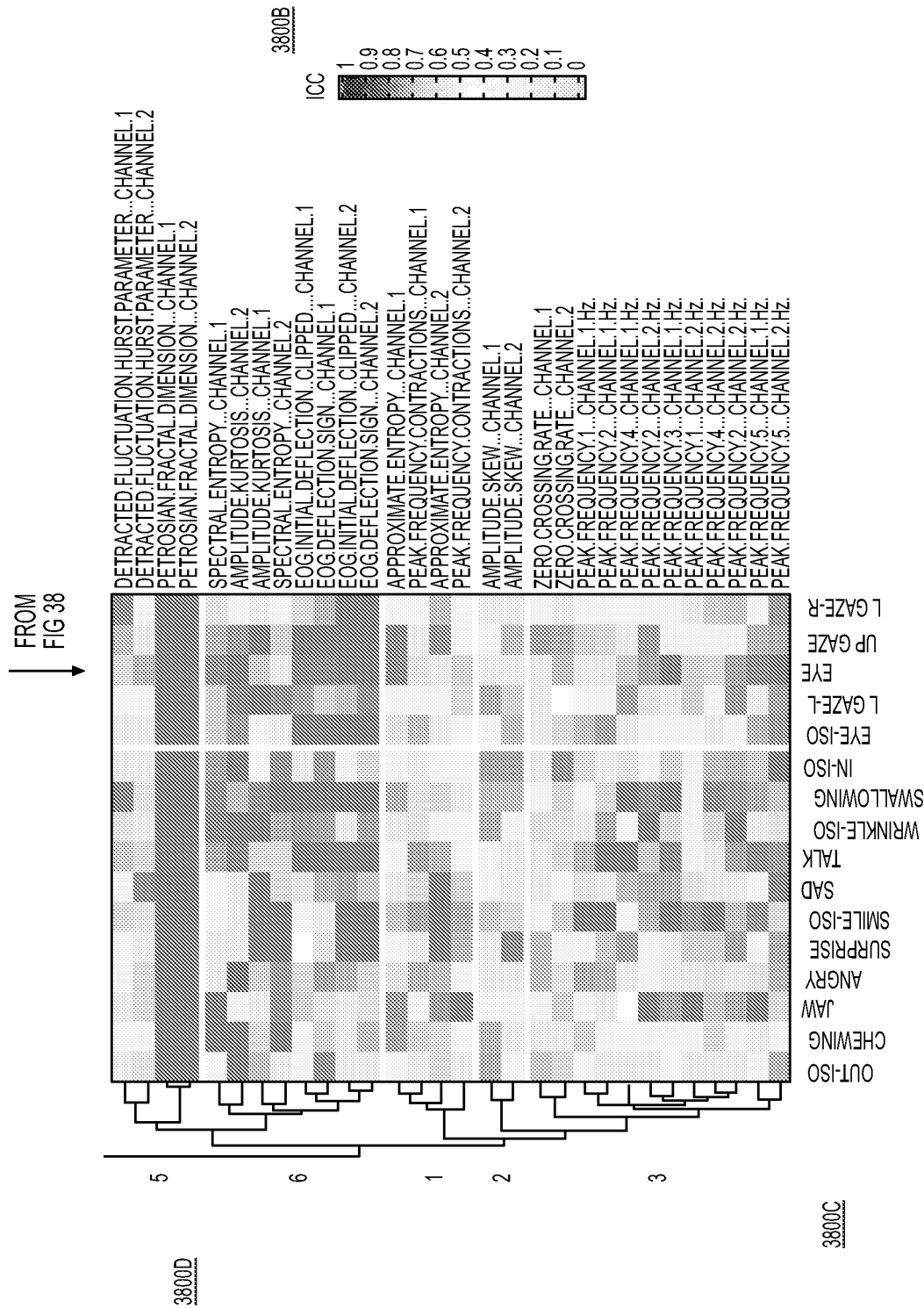


FIG. 38 (CONT. 1)

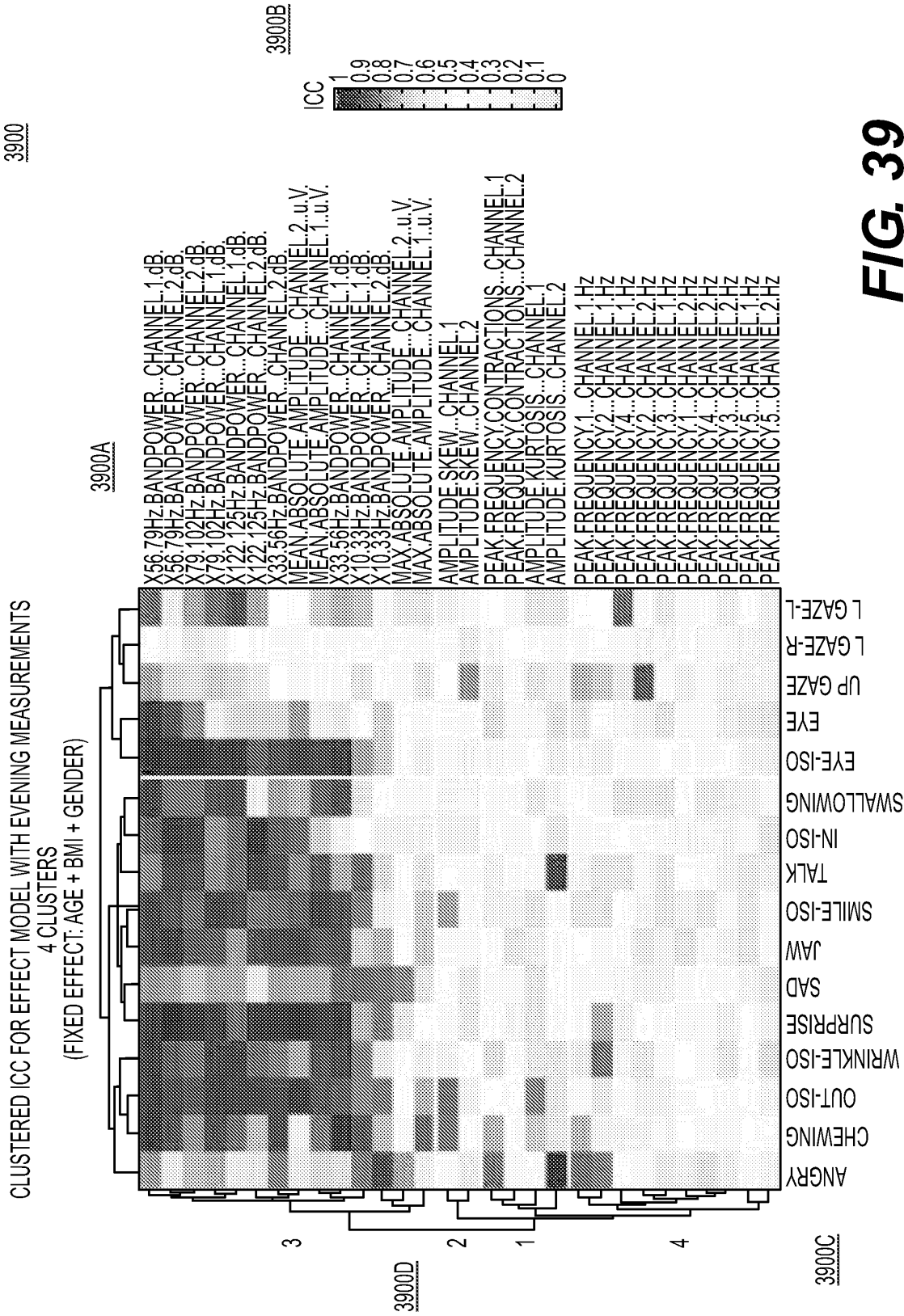


FIG. 39

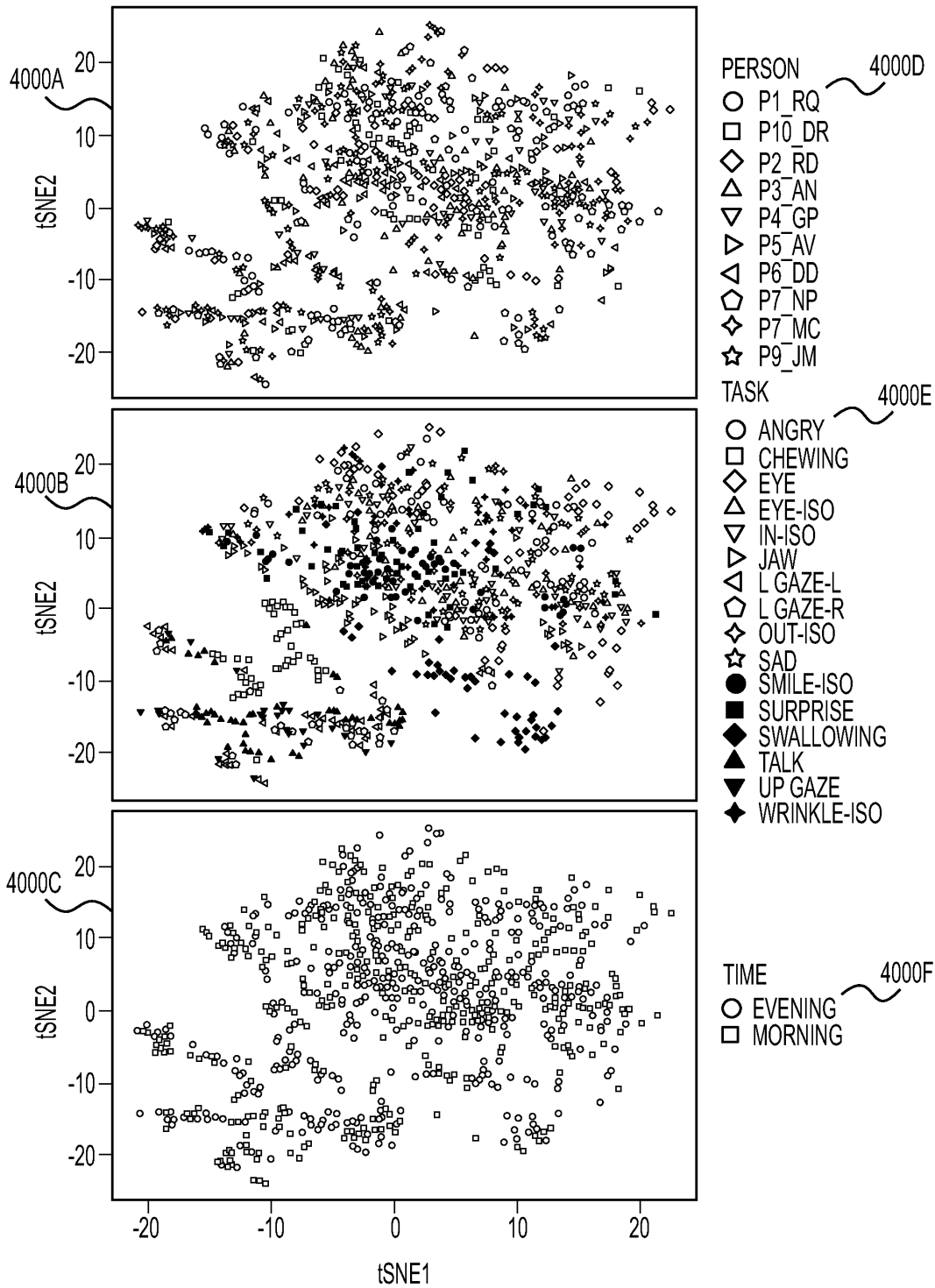
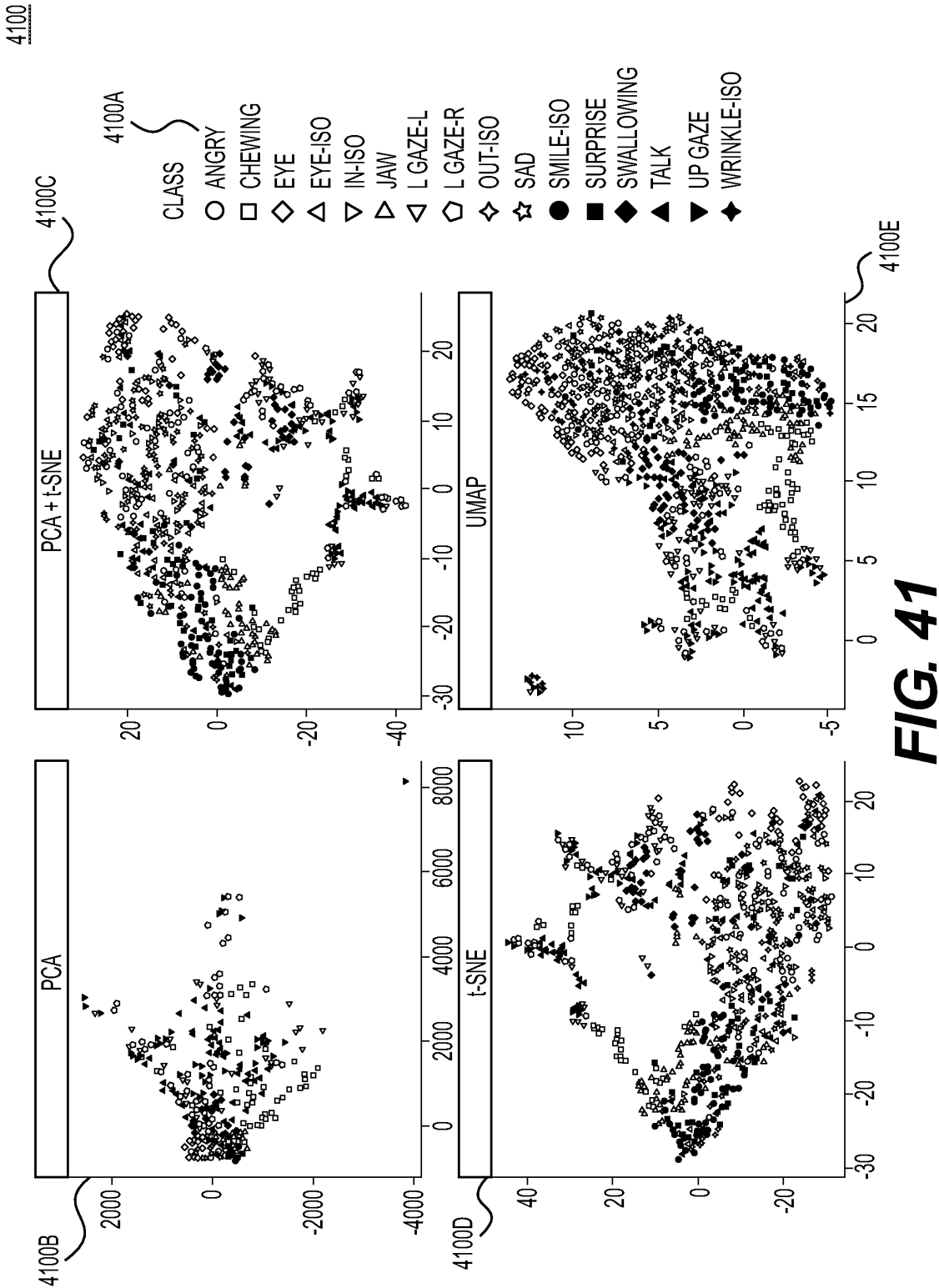


FIG. 40



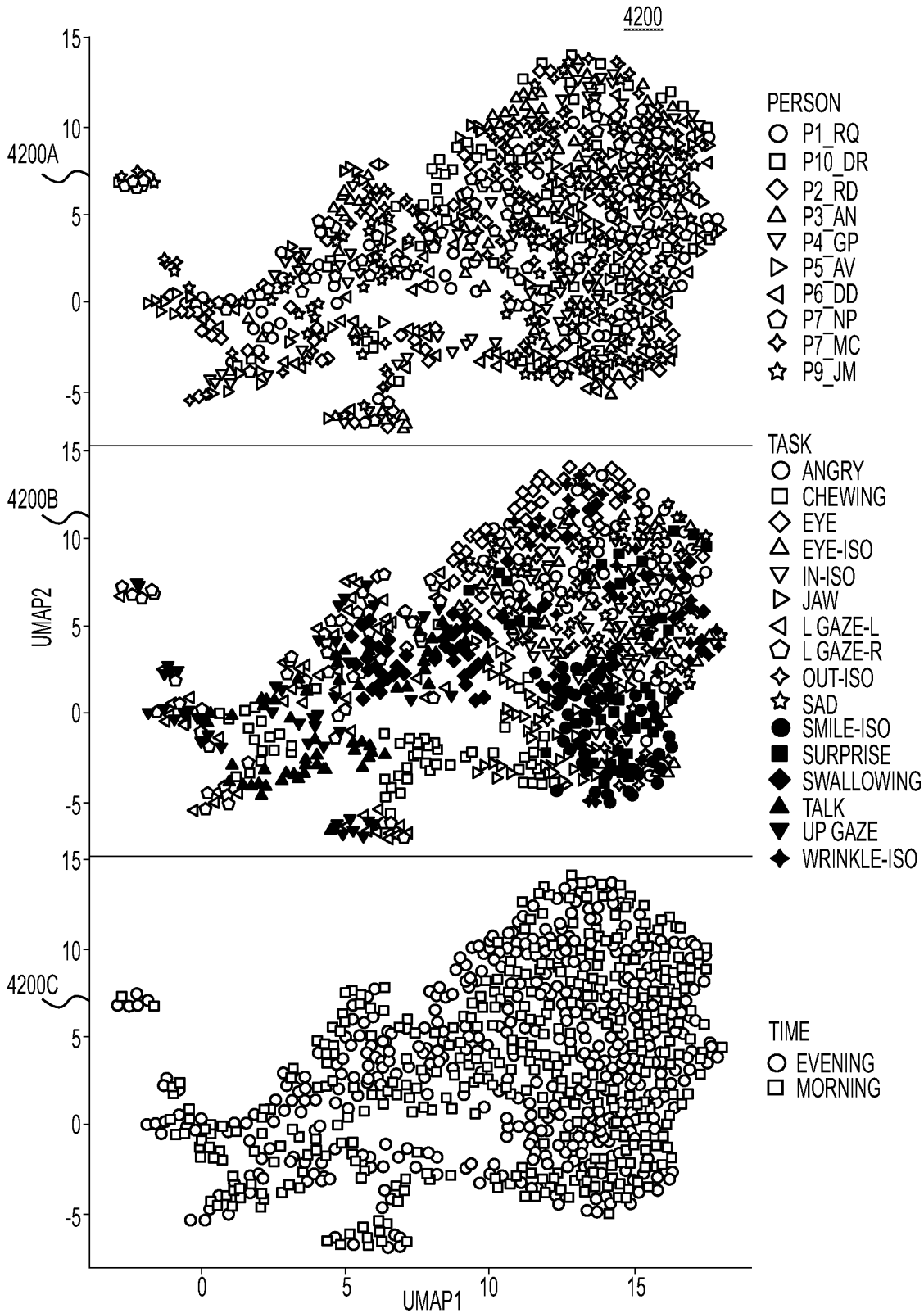


FIG. 42

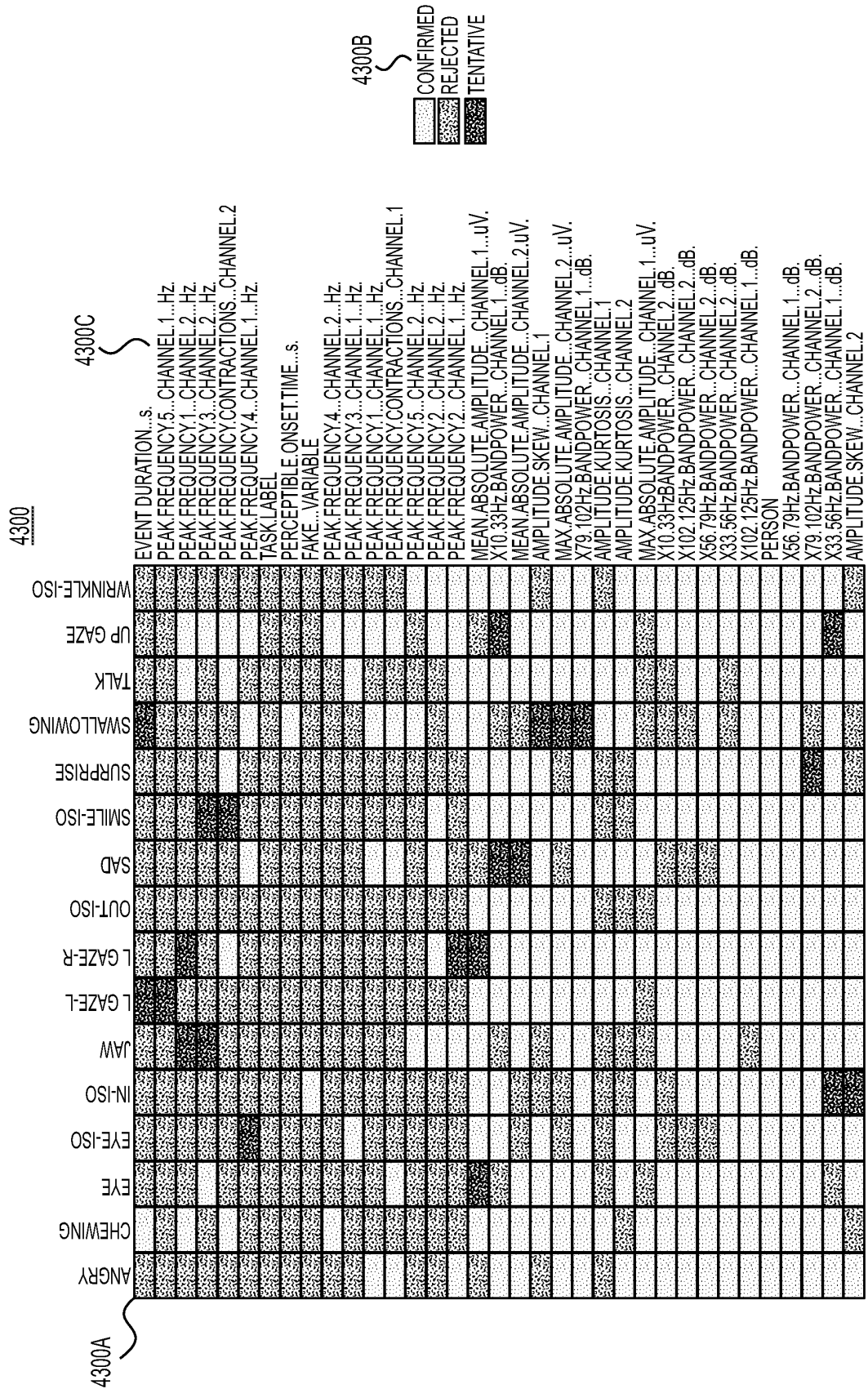


FIG. 43

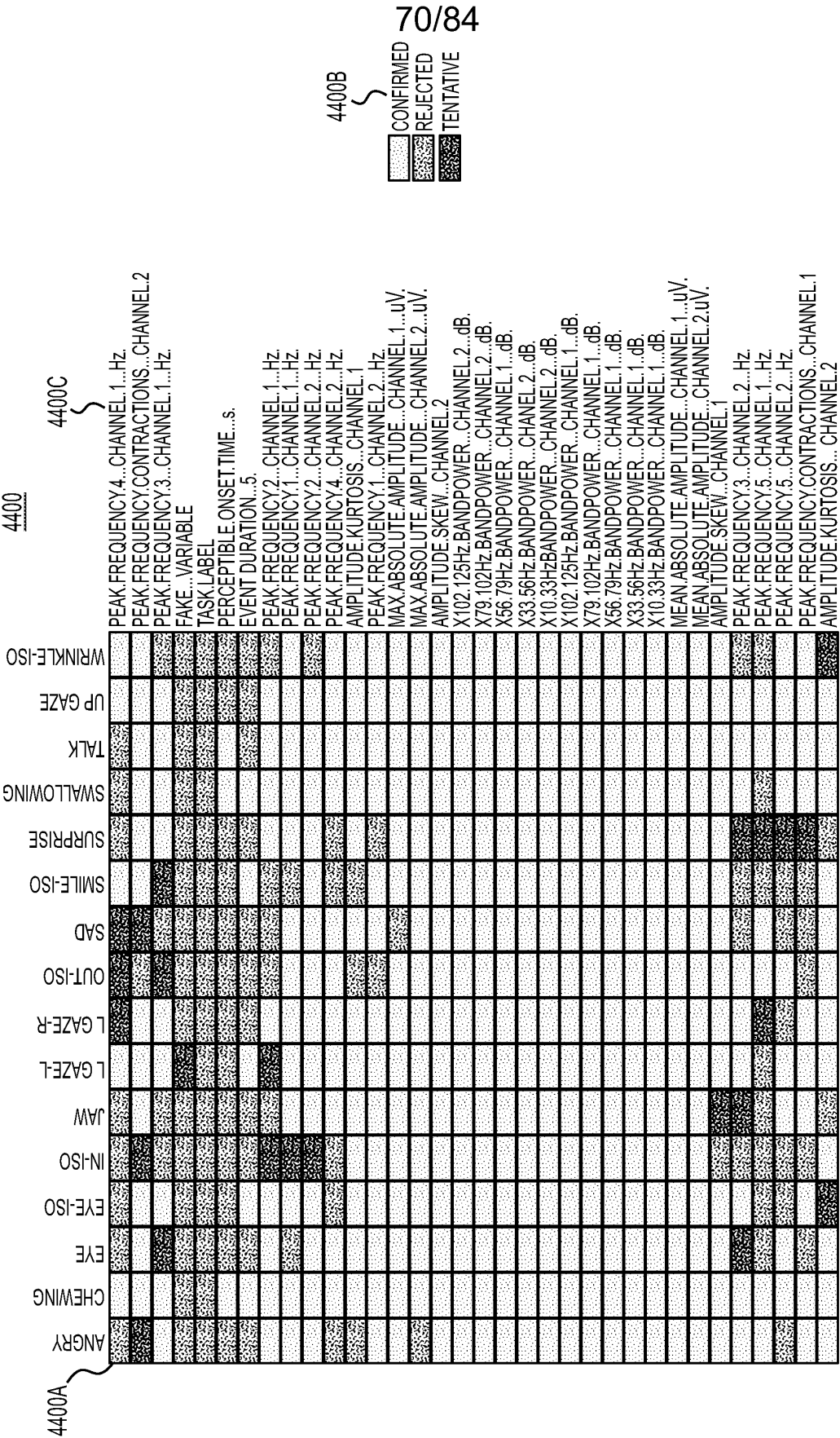


FIG. 44

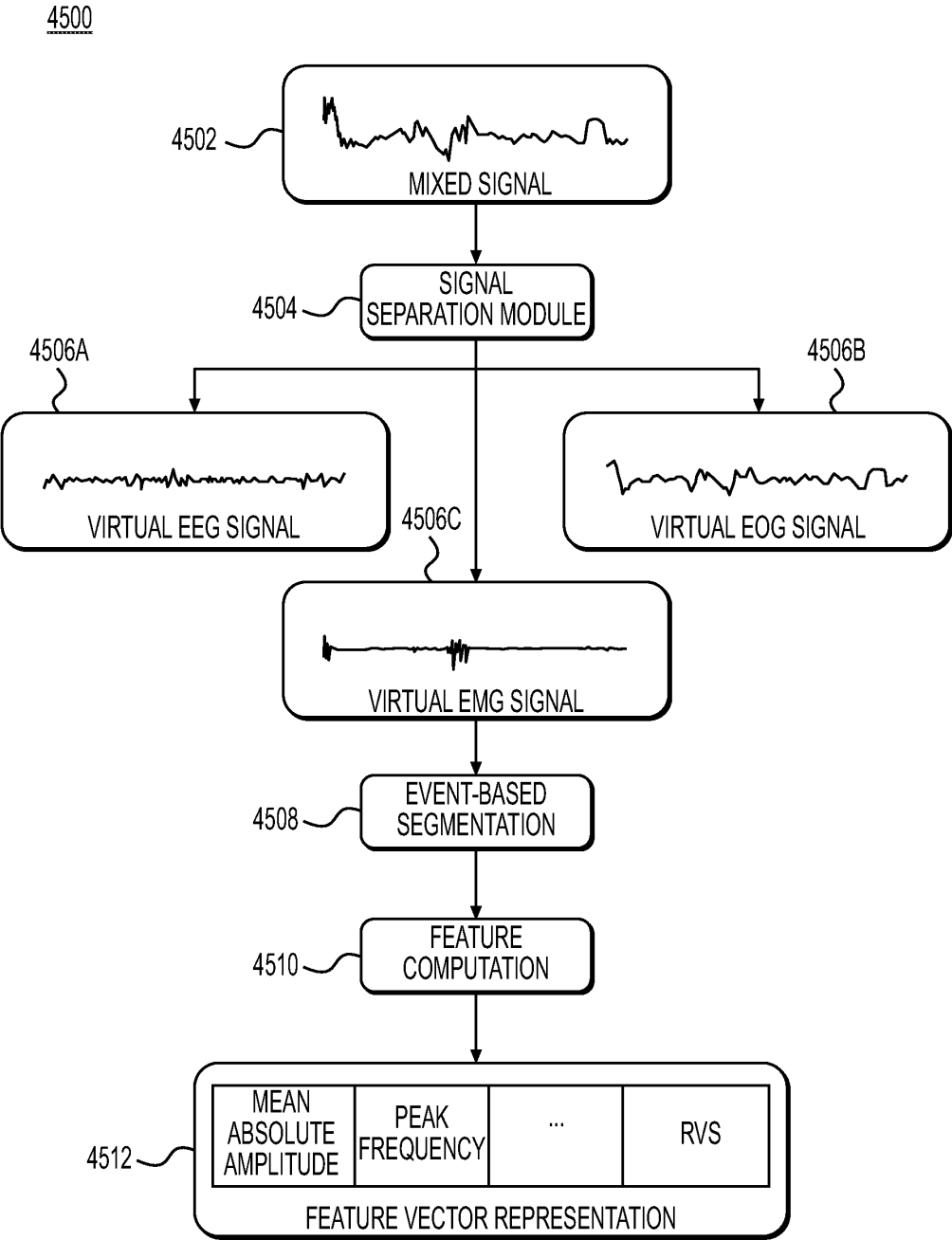


FIG. 45

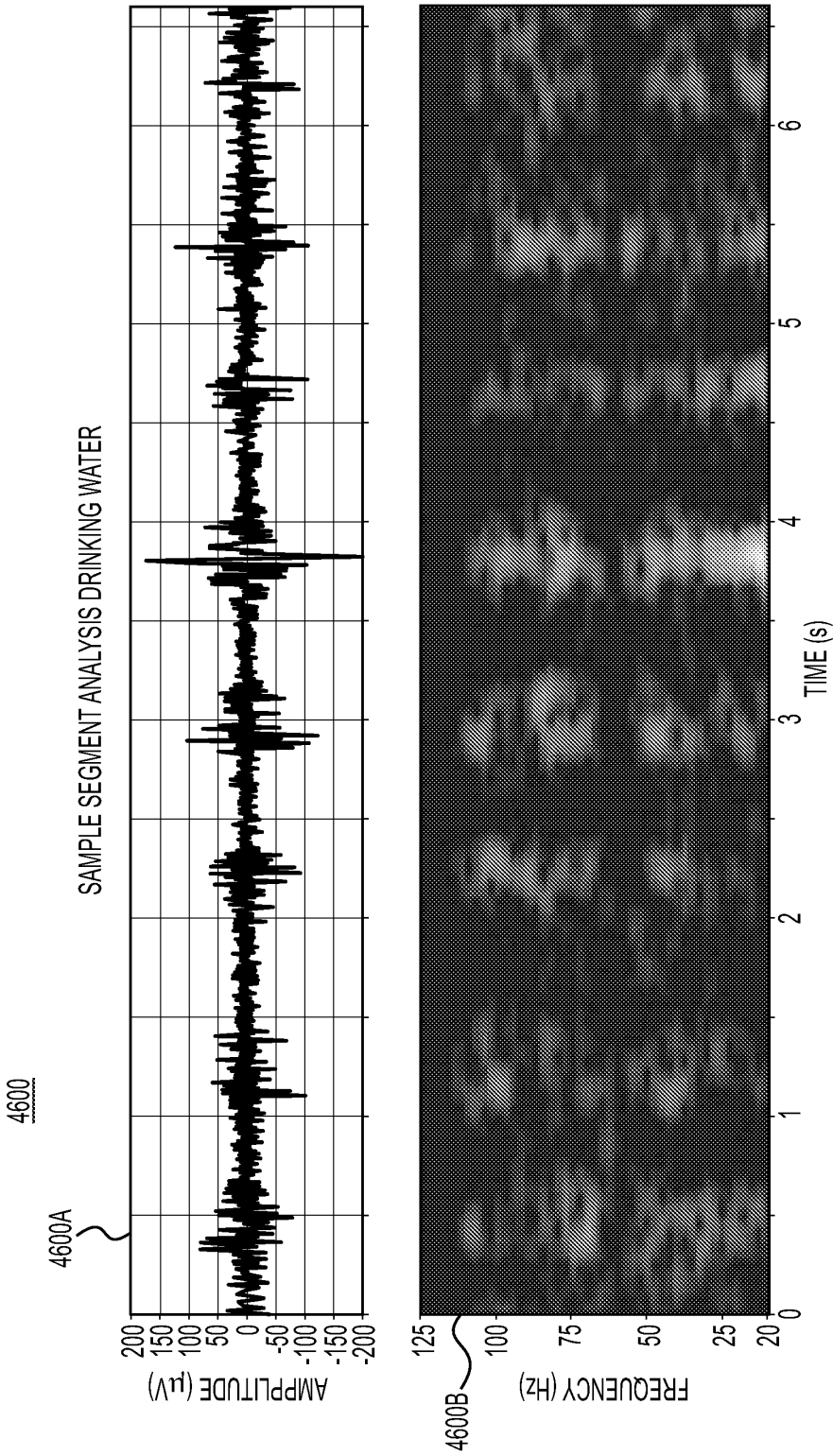
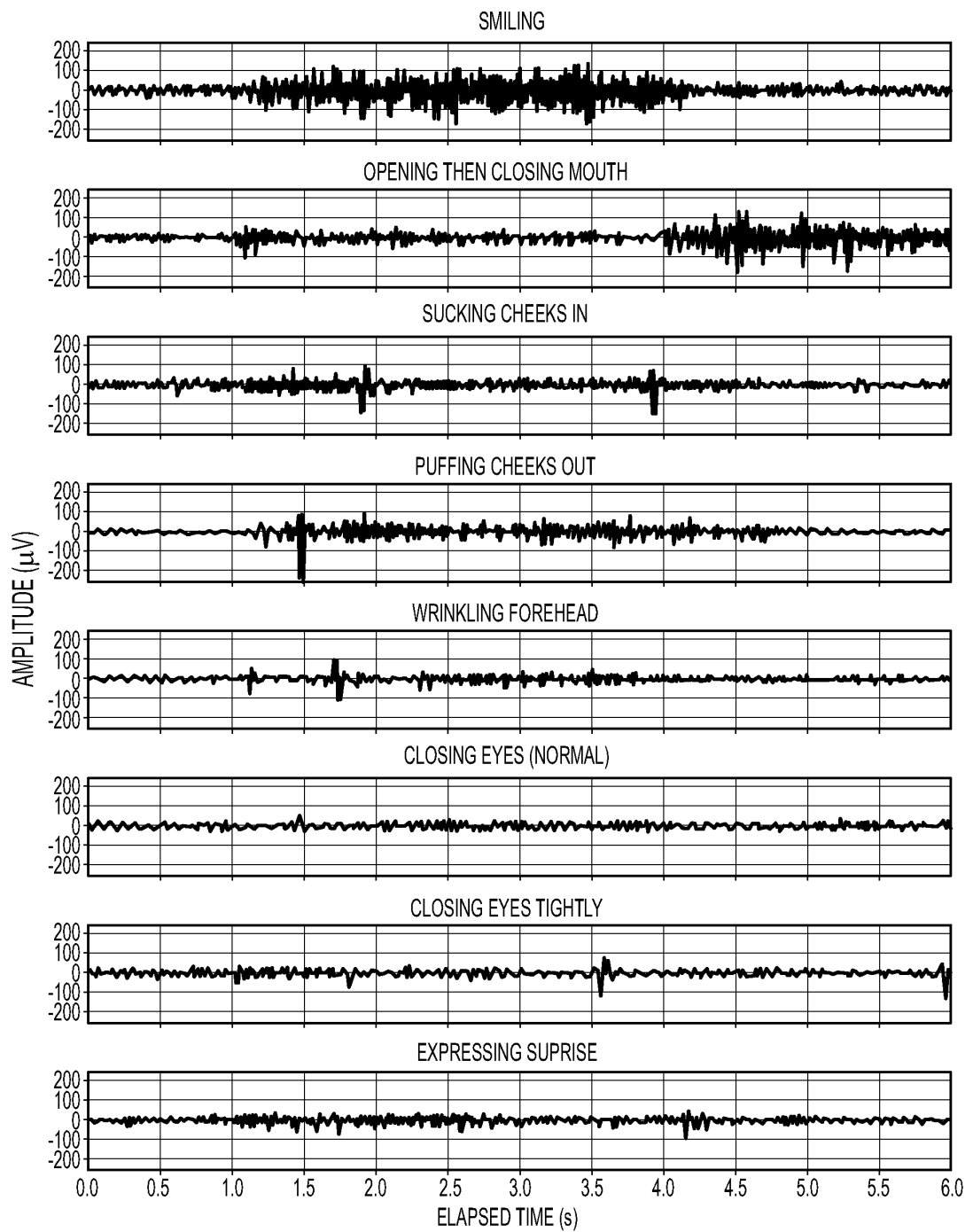


FIG. 46

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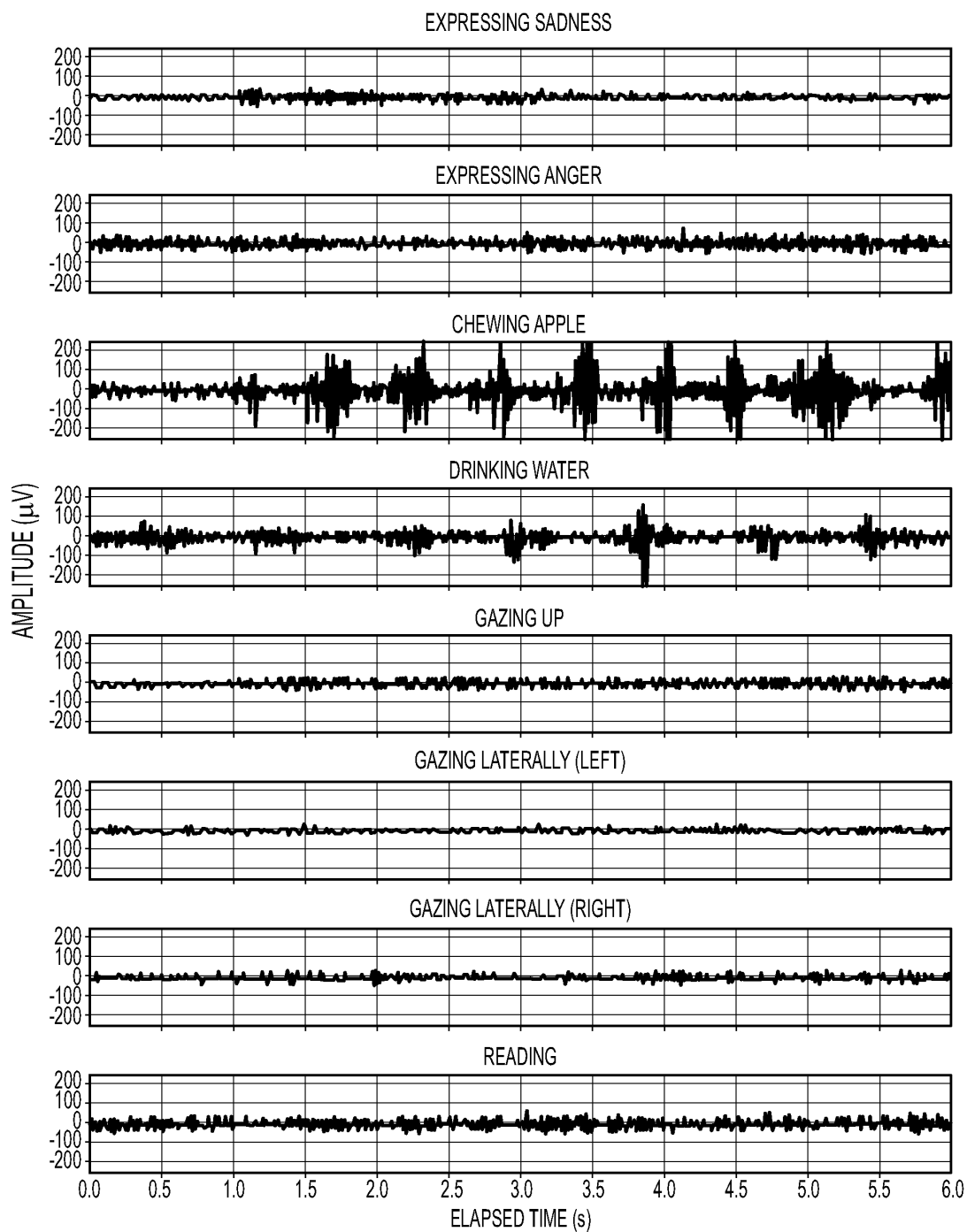


TO
FIG. 47
CONT. 1

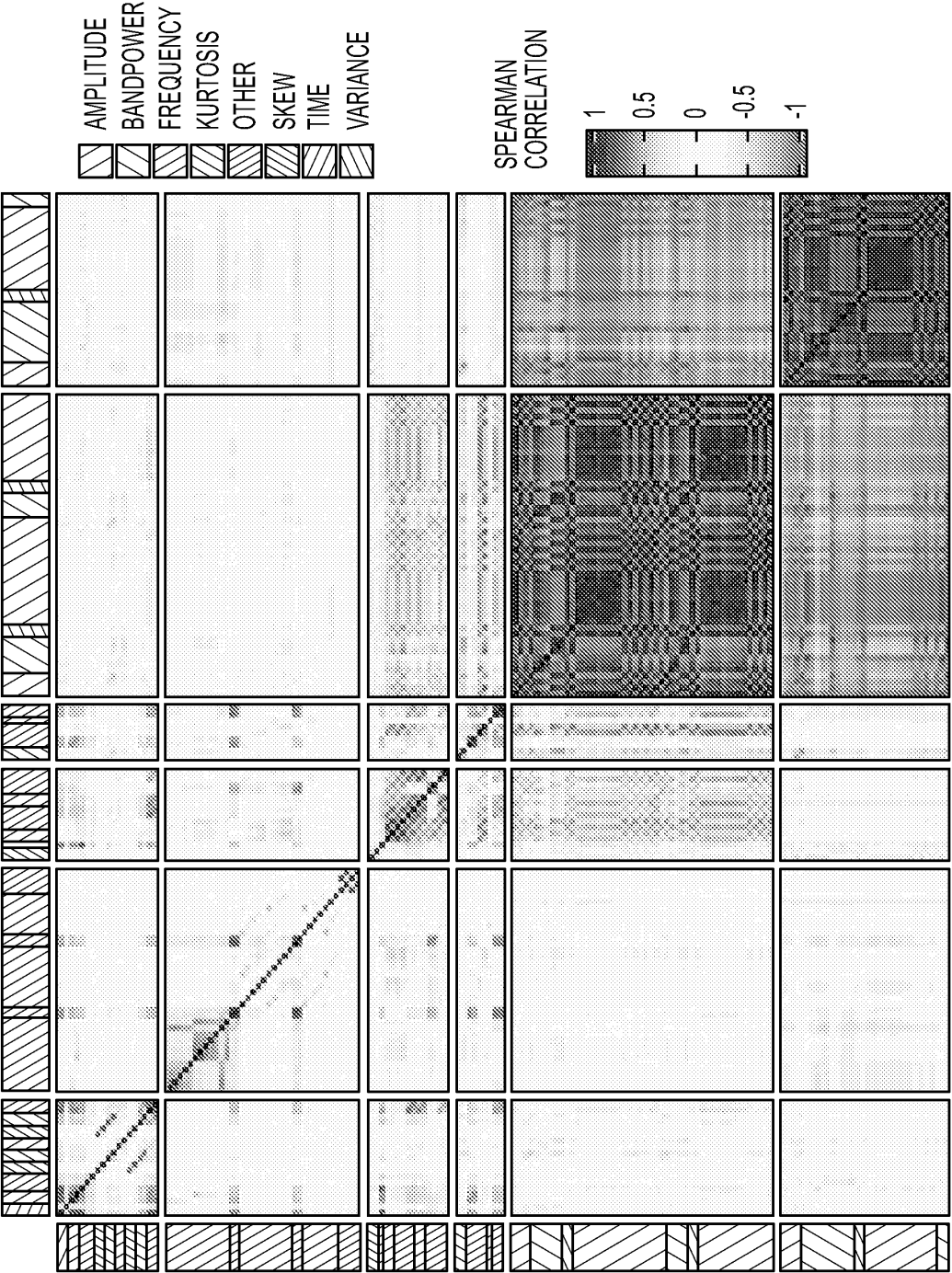
FIG. 47

SUBSTITUTE SHEET (RULE 26)

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FROM
FIG. 47
↓**FIG. 47** (CONT. 1)

SUBSTITUTE SHEET (RULE 26)



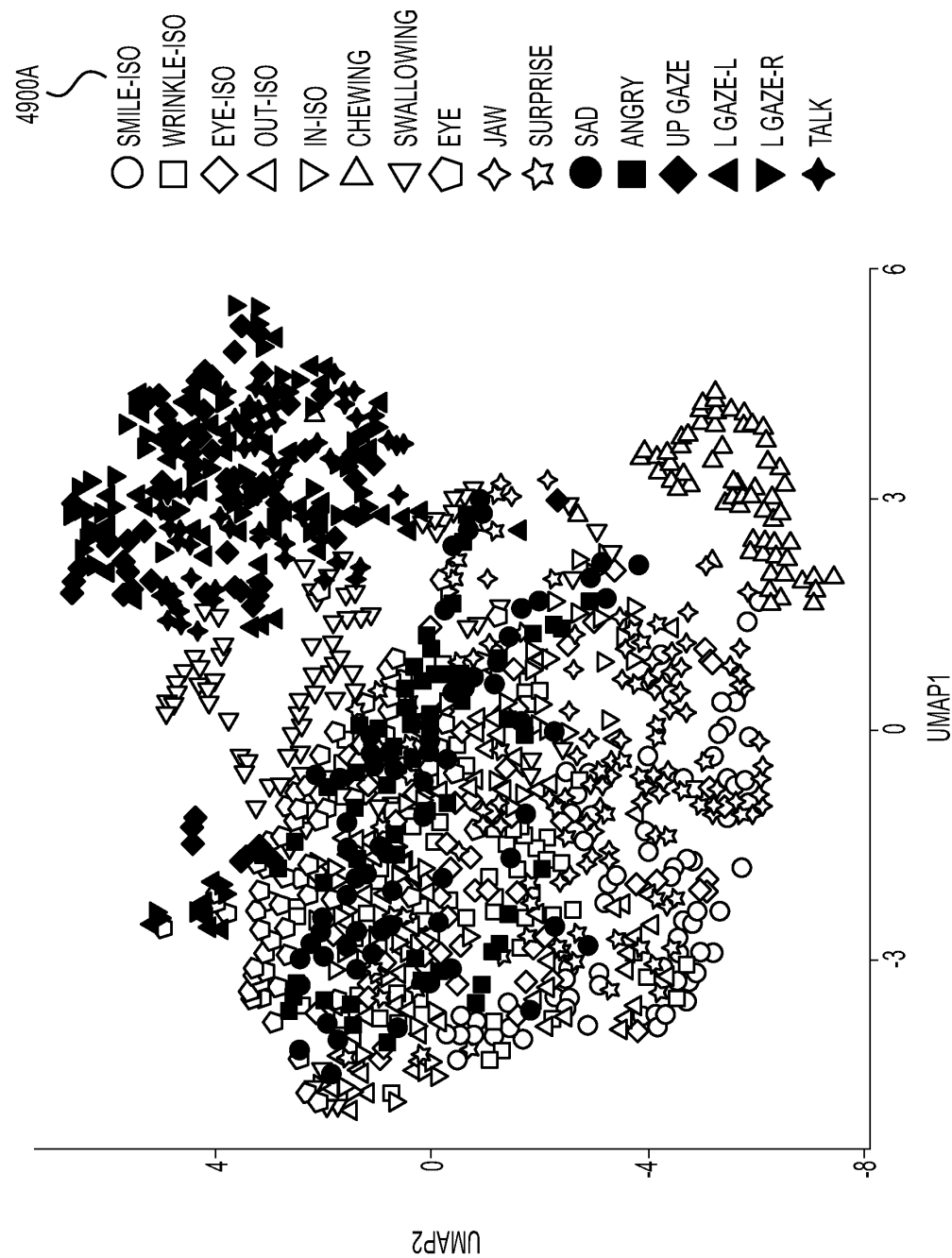


FIG. 49

TO FIG 50
CONT. 1
→

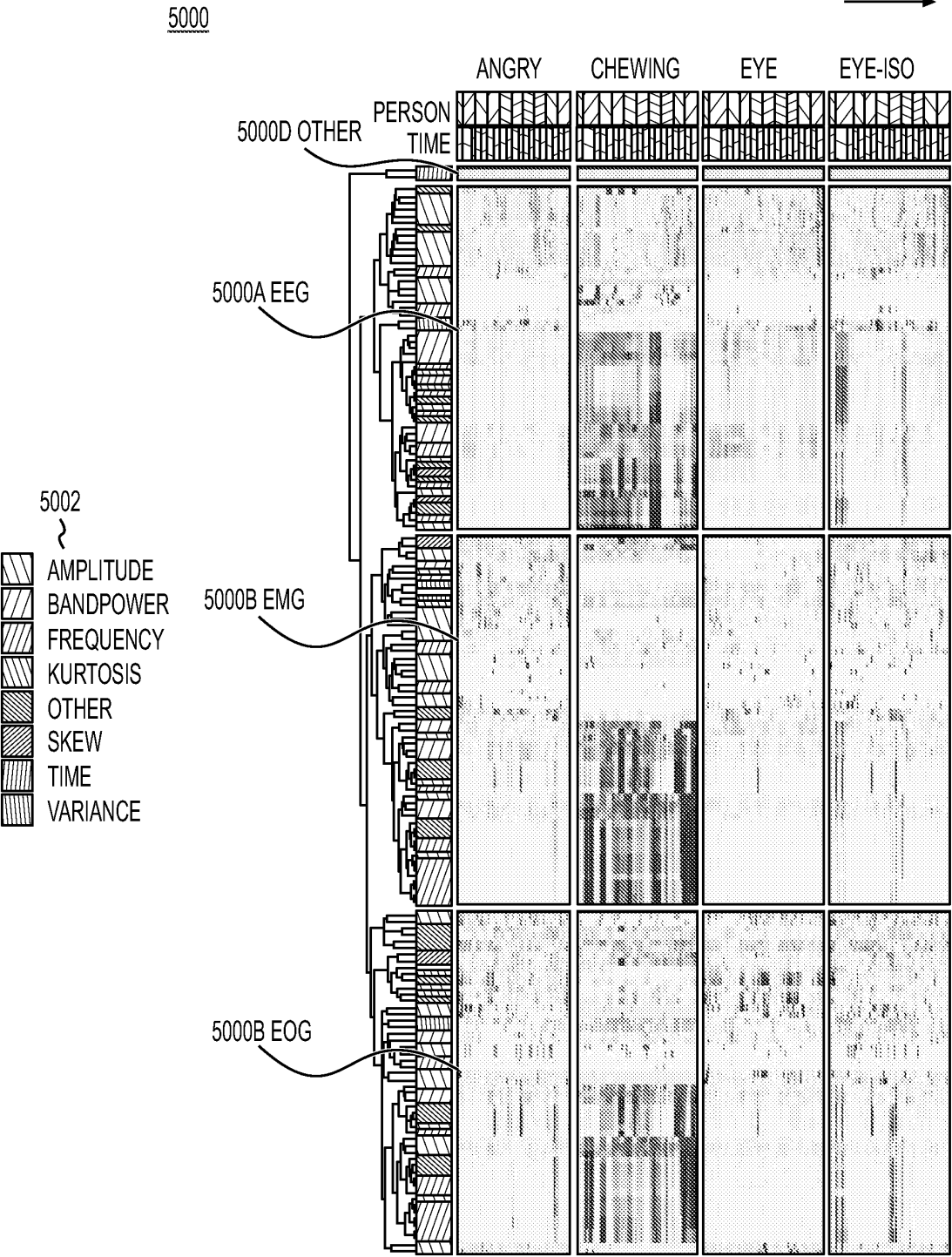


FIG. 50

SUBSTITUTE SHEET (RULE 26)

FROM
FIG 50
→

→
TO FIG 50
CONT. 2

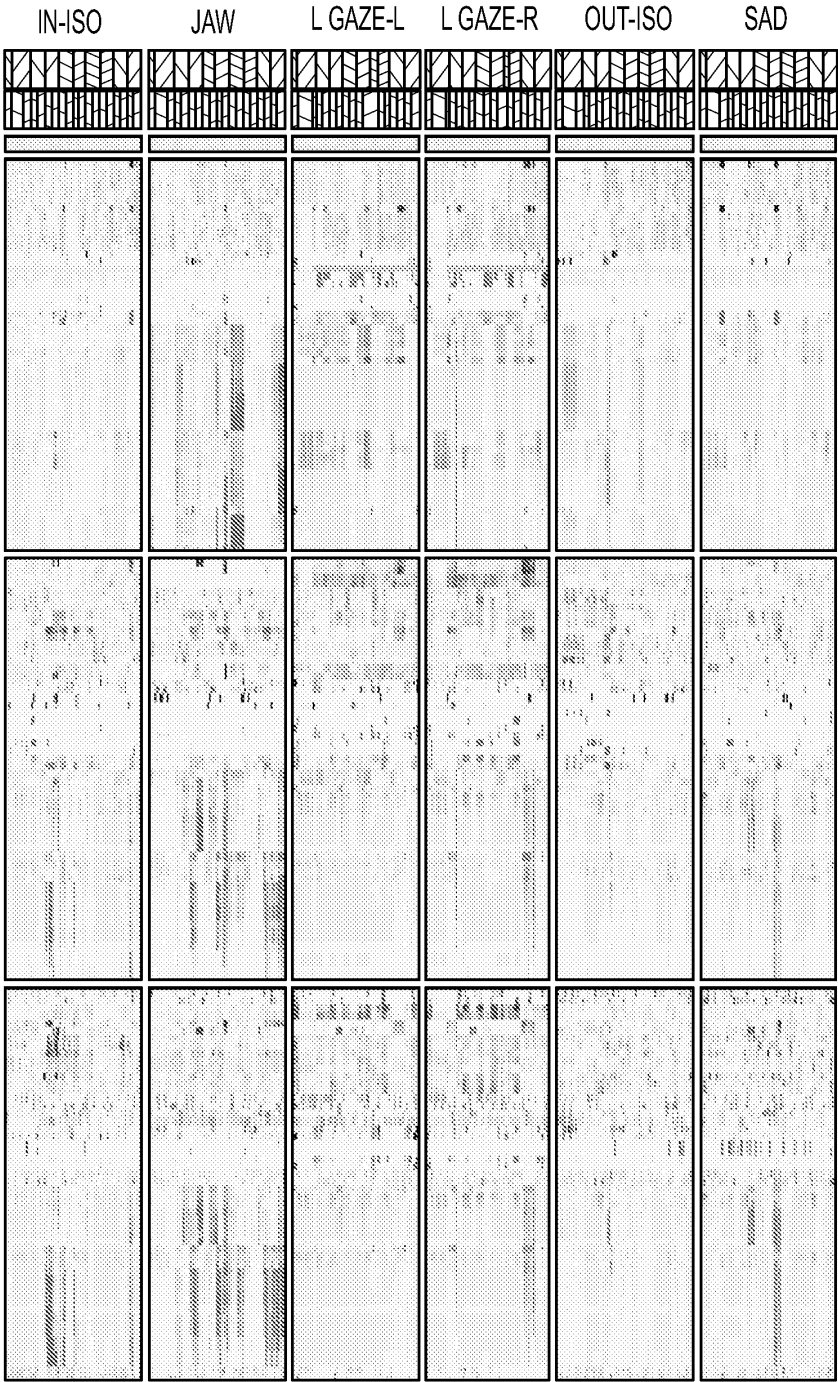


FIG. 50 (CONT. 1)

SUBSTITUTE SHEET (RULE 26)

FROM
FIG 50
CONT. 1

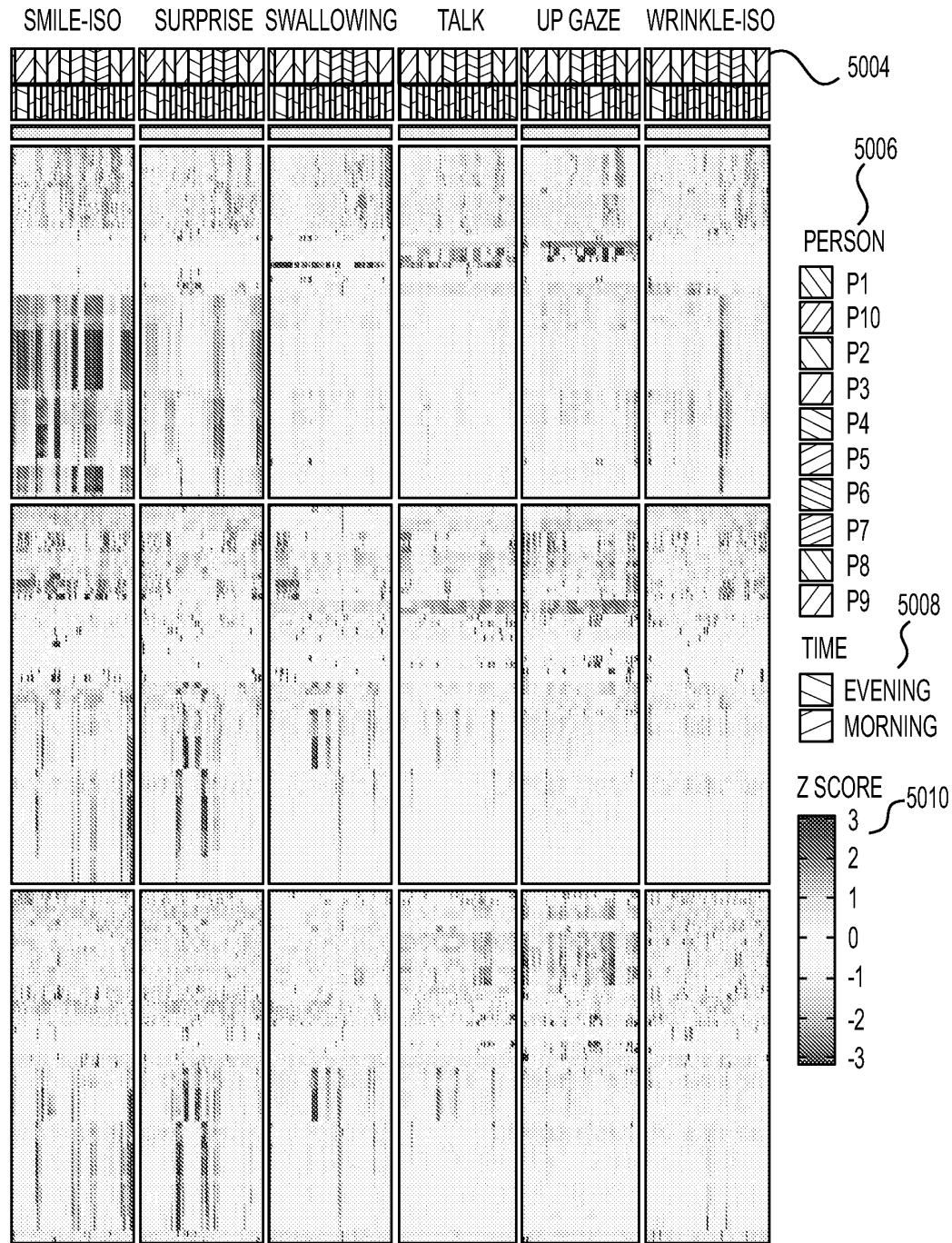


FIG. 50 (CONT. 2)

SUBSTITUTE SHEET (RULE 26)

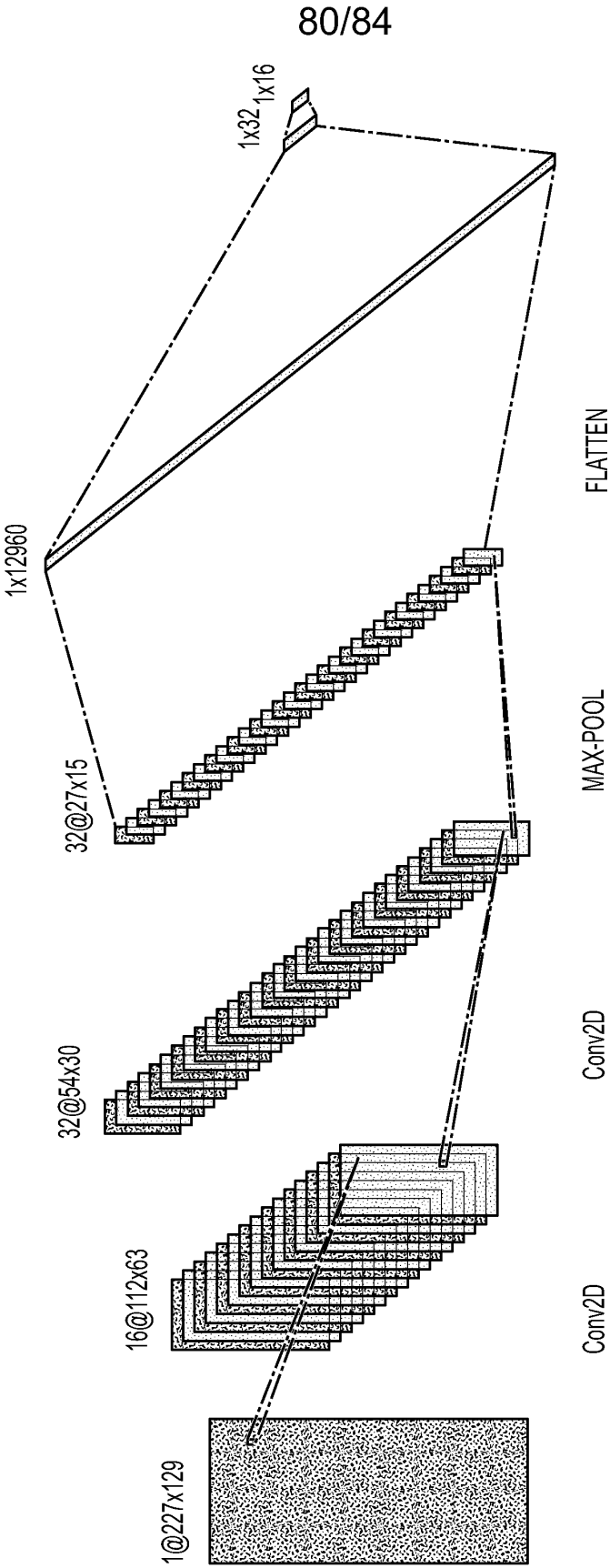
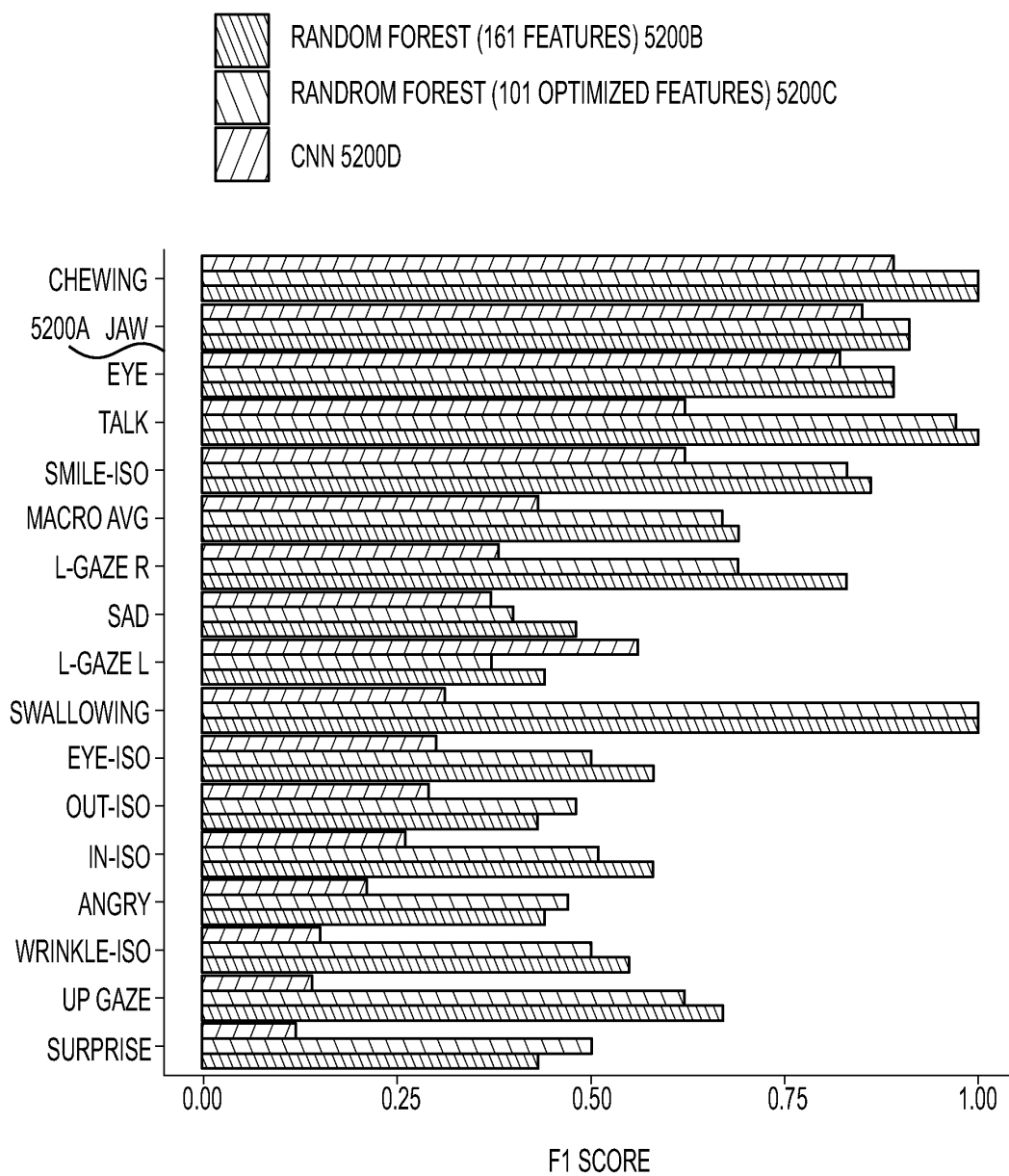


FIG. 51

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5200

**FIG. 52**

SUBSTITUTE SHEET (RULE 26)

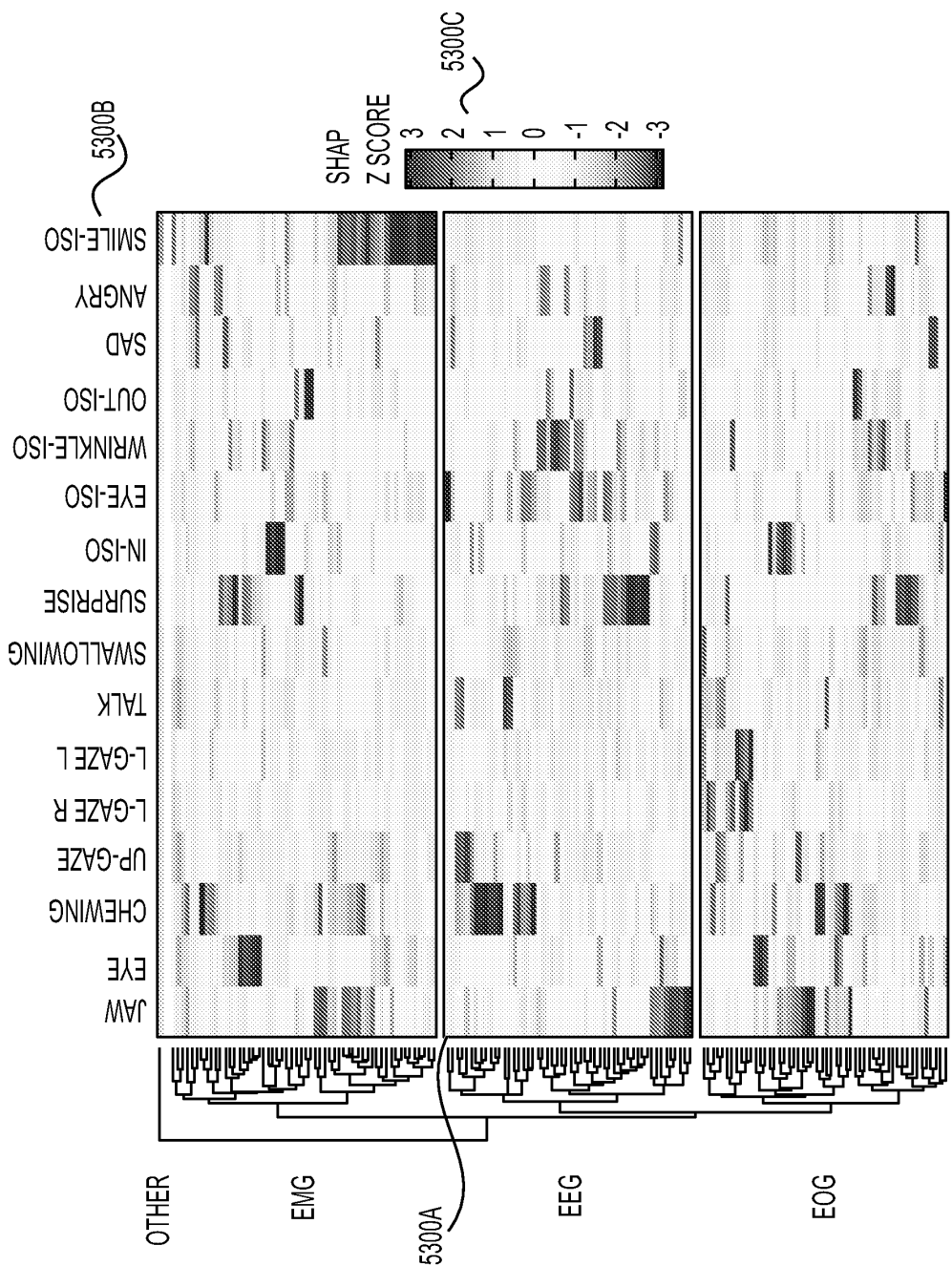


FIG. 53

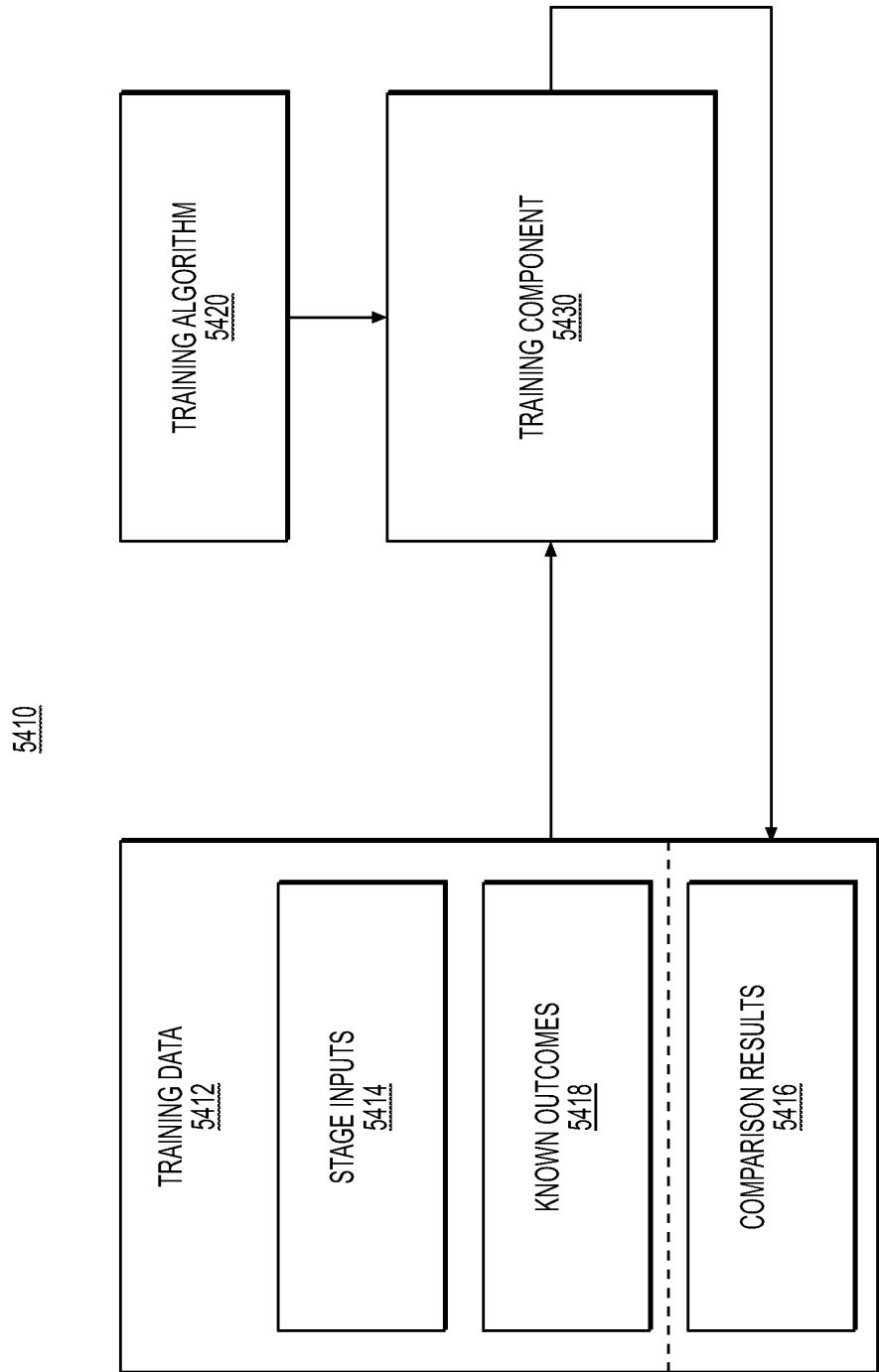


FIG. 54

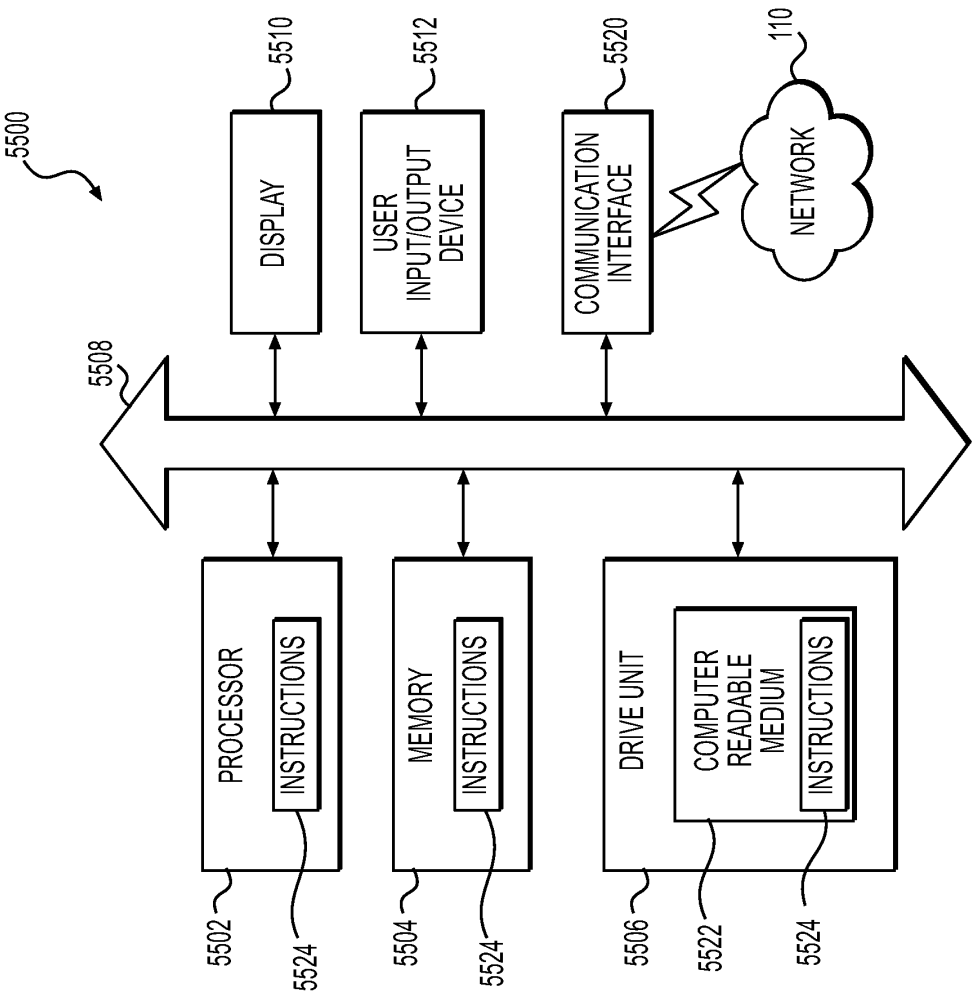


FIG. 55