Appeal decision

Appeal No. 2016-3654

USA
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The case of appeal against the examiner’s decision of refusal of Japanese Patent Application No. 2013-527127, entitled "Multi-range Radar System" (International Publication on March 8, 2012, WO2012/030615, National publication of the translated version on October 17, 2013, National Publication of International Patent Application No. 2013-539022) has resulted in the following appeal decision.

[Conclusion]

The appeal of the case was groundless.

[Reason]

No. 1 History of the procedures

The application was submitted on August 25, 2011 (Heisei 23) (priority claim under the Paris Convention: September 1, 2010 (Heisei 22) (hereinafter, referred to as the "priority date," United States of America) as an international filing date, and despite the submission of a written opinion and a written amendment (amendment made by the written amendment is, hereinafter, referred to as "Amendment 1") on May 11, 2015 against a notice of reasons for refusal dated February 6, 2015, the examiner’s decision of refusal (delivery of a certified copy on November 10, 2015) (hereinafter, referred to as the "examiner’s decision") was issued on October 27, 2015. Against that, an appeal against the examiner's decision of refusal was requested on March 9, 2016 and a written amendment (amendment made by the written amendment is, hereinafter, referred to as the "Amendment") was simultaneously submitted, and a written statement was submitted on August 30, 2016.

No. 2 Decision to dismiss amendment on the Amendment
[Conclusion of Decision to Dismiss Amendment]
The Amendment shall be dismissed.

[Reason]
1 Details of Amendment
The Amendment includes the following amended matters relating to Claim 1 of the scope of claims.
(1) Description of Claim 1 before the Amendment
The description of Claim 1 in the scope of claims amended by Amendment 1 before the Amendment is as follows.
"A multi-range radar system comprising:
a transmitter antenna:
a first microwave radiation source operably connected to the transmitter antenna, the first microwave radiation source being formed to detect an object within a first range;
a second microwave radiation source operably connected to the transmitter antenna, and different from the first microwave radiation source, the second microwave radiation source being formed to detect an object within a second range different from the first range;
a multiplexer operable to selectively connect the first and second microwave radiation sources to the transmitter antenna, so as to independently or simultaneously transmit the first and second microwave radiation sources through the transmitter antenna;
a receiver operable to receive an echo from the first and second microwave radiation sources; and
a processor operable to receive an echo from the receiver and process the echo

so as to determine a place of the detected object, the processor being operable to control the first microwave radiation source so as to generate a desired waveform operable to detect an object within a distance of an intermediate range or a long range of the transmitter antenna."

(2) Description of Claim 1 after the Amendment

The description of Claim 1 of the scope of claims after the Amendment is as follows (the underlines indicate the amended parts.).

"A multi-range radar system comprising:

a transmitter antenna:

a first microwave radiation source operably connected to the transmitter antenna, the first microwave radiation source being formed to detect an object within a first range;

a second microwave radiation source operably connected to the transmitter antenna, and different from the first microwave radiation source, the second microwave radiation source being formed to detect an object within a second range different from the first range;

a multiplexer operable to selectively connect the first and second microwave radiation sources to the transmitter antenna, so as to independently or simultaneously transmit the first and second microwave radiation sources through the transmitter antenna;

a receiver operable to receive an echo from the first and second microwave radiation sources, the receiver including a plurality of elements;

a processor operable to receive an echo from the receiver and process the echo so as to determine a place of the detected object, the processor being operable to control the first microwave radiation source so as to generate a desired waveform operable to detect an object within a distance of an intermediate range or a long range of the transmitter antenna; and

a phase shifter,

wherein when the first microwave radiation source is controlled to generate the desired waveform operable so as to detect the object within the distance of the long range, and the plurality of elements is divided into a plurality of groups respectively including a predetermined number of the elements, the processor is further operable to start up the phase shifter to set the predetermined number of the elements in one group to be equal phase shifts, in relation to each group.

2 Purpose of Amendment

The amended matters of the Amendment, regarding the necessary matters for specifying the invention described in Claim 1 before the Amendment, limit each of the point that "a receiver" "includes a plurality of elements," the point of "comprising" "a phase shifter," and the point that "when the first microwave radiation source is controlled to generate the desired waveform operable so as to detect the object within the distance of the long range, and the plurality of elements is divided into a plurality of groups respectively including a predetermined number of the elements, the processor is further operable to start up the phase shifter to set the predetermined number of the elements in one group to be equal phase shifts, in relation to each group." The invention described in Claim 1 before the amendment and the invention described in Claim 1 after the amendment are identical regarding the field of industrial application and the problems to be solved, so that it falls under the restriction of the scope of claims in accordance with Article 17-2 (5) (ii) of the Patent Act.

3 Judgment on independent requirements for patentability

Then, we will examine below whether or not the appellant should be granted a patent independently at the time of patent application for the invention specified by the matters described in Claim 1 after the amendment according to the Amendment (hereinafter, referred to as the "Amended Invention").

(1) The Amended Invention

The Amended Invention is as described in 1(2) above.

(2) Cited Documents

A Cited Document 1

(A) Japanese Unexamined Patent Application Publication No. 2008-249399 (the application published on October 16, 2008, hereinafter, referred to as "Cited Document 1") which is a publication distributed before the priority date of the application and which is cited in the reasons for refusal stated in the examiner's decision, describes the following together with drawings (underlines were added by the body. Hereinafter, the same).

a "[Field of the Invention]

[0001]

The present invention relates to a technical field of an on-vehicle radar device using radio waves, and more particularly, relates to a technical field of a compound mode radar device using a plurality of frequency band modes."

b "[0028]

On the other hand, in the compound mode radar device of the present invention, in the high frequency band from 22 GHz to 29 GHz, the band is set up so that a narrow-band signal and a broadband signal may not be superimposed on each other. As an example, in Fig. 2 (a), the first frequency that is the center frequency of a narrow-band radar is made to be 24.125 GHz for example, and the second frequency that is the center frequency of a broadband radar is 26.5 GHz for example. While the bandwidth of the narrow-band signal is made to be 200 MHz or less, the broadband signal is made to be a UWB signal and its bandwidth is made to be at least 450 MHz or more."

c "[0030]

The basic constitution of the compound mode radar device relating to the first embodiment of the present invention is described by reference to the block diagram shown in Fig. 1. The compound mode radar device 100 of the present embodiment is provided with the narrow-band radar part 102 and the broadband radar part 103 in the same housing, and is configured to operate them in a cooperative manner under the control of the computing part 101. Data measured by the narrow-band radar part 102 and the broadband radar part 103 are inputted together in the computing part 101, and measurement of an angle is performed with high precision by the computing part 101 based on the detection data inputted from them.

[0031]

As an antenna for transmitting and receiving a narrow-band signal and a broadband signal, the present embodiment is provided with the narrow-band transmission antenna 151, the broadband transmission antenna 152, and the common reception antennas 153a and 153b that are installed apart from each other on the right and left sides. In order to perform angle detection using a monopulse system, the two common reception antennas 153a and 153b are provided on the right and left sides, thereby configuring to receive two-way reflected waves.

[0032]

The narrow-band radar part 102 which uses a narrow-band signal having the first frequency as a center frequency for angle measurement is provided with the narrow-band signal generating part 110 which generates the narrow-band signal, and a narrow-band reception processing part 130 which inputs reception signals from the common reception antennas 153a and 153b to obtain detection data. The broadband radar part 103 which uses a broadband signal having the second frequency as a center frequency for angle measurement is provided with the broadband signal generating part 120 which generates the broadband signal, and a broadband reception processing part 140 which inputs reception signals from the common reception antenna 153a and 153b to obtain detection data.

[0033]

The narrow-band signal generating part 110 is equipped with the narrow-band wave source 111, and after the narrow-band signal generated here is amplified with the amplifier 112, it is transmitted from the narrow-band transmission antenna 151. VCO (Voltage Controlled Oscillator) is used as the narrow-band wave source 111 here. According to this embodiment, it supposes that FMCW is used as a narrow-band signal, and VCO is used for generating the continuous wave in which frequency modulation is carried out.

[0034]

In the radar function using FMCW, the continuous wave in which frequency is sequentially changed by the time series is used, and performs measurement by using the characteristics that frequency becomes high when this is reflected and received by the distant object, and frequency becomes low when reflected by a nearby object. FMCW performs frequency modulation using the control signal of the shape of a triangular wave as shown in Fig. 3. In order to generate the control signal of the shape of such a triangular wave, the triangular-wave generator 104 is provided in this embodiment.

[0035]

The triangular-wave generator 104 outputs the control signal of the shape of the triangular wave as shown in Fig. 3 to VCO which is the narrow-band wave source 111, according to a control value set in advance by the computing part 101. The VCO generates the high frequency wave whose frequency is modulated in the shape of the triangular wave according to the control signal inputted from the triangular-wave generator 104, and outputs that as the narrow-band wave. The modulation width (bandwidth) of the frequency using the triangular-wave-shaped control signal is as small as about 20 MHz, and the signal generated by the narrow-band signal generating part 110 is a narrow-band signal.

[0036]

The switch 113 is provided so that the narrow-band signal which is generated by the narrow-band wave source 111 and is amplified with the amplifier 112 may be outputted to the narrow-band transmission antenna 151 according to the control from the computing part 101. The narrow-band signal is a continuous wave and it is not preferable for a radar function to always continue transmitting this. That is, if the narrow-band signal of a continuous wave is always outputted, because of surroundings lump, a part of the narrow-band signal is directly received by the reception antennas 153a and 153b, and the reception circuit will be saturated to make measurement impossible. Then, by providing the switch 113, it is closed to transmit the narrow-band signal from the narrow-band transmission antenna 151 only when a request of transmission is issued from the computing part 101."

d "[0045]

The compound mode radar device 100 of this embodiment is configured to enable the narrow-band radar part 102 and the broadband radar part 103 to cooperate by control from the computing part 101, and it is possible to perform advanced angle measurements by combining the narrow-band detection data detected by the narrow-band radar part 102 and the broadband detection data detected by the broadband radar part 103. As one example, it is possible to use the narrow-band radar part 102 and the broadband radar part 103 in basic motion shown in Fig. 5, and by combining this basic motion, the narrow-band radar part 102 and the broadband radar part 103 cooperate to be able to materialize a preferable radar function.

[0046]

As the basic motion mentioned above, there are two kinds of switch systems; one in which the narrow-band radar part 102 and the broadband radar part 103 are properly switched to operate, as shown in Fig. 5(a), and a parallel system in which the narrow-band radar part 102 and the broadband radar part 103 are operated in parallel, as shown in Fig. 5(b). By using such basic motion, it becomes possible to perform advanced angle detection.

[0047]

Namely, it becomes possible to perform the angle detection by the broadband radar part 103 and the angle detection by the narrow-band radar part 102 in parallel, such that in the angle detection to an object at a short distance, measurement is performed using the broadband radar part 103, and simultaneously, in the angle detection to an object at a long-distance, detection is performed using the narrow-band radar part 102."

e "[0049]

The basic constitution of the compound mode radar device concerning the second embodiment of the present invention is described by reference to the block diagram shown in Fig. 6. In the compound mode radar device 200 of this embodiment, the narrow-band signal generated by the narrow-band signal generating part 110, and the broadband signal generated by the broadband signal generating part 120 are transmitted with the common transmission antenna 251.

[0050]

Although the narrow-band transmission antenna 151 for transmitting the narrow-band signal and the broadband transmission antenna 152 for transmitting the broadband signal are independently provided in the first embodiment, according to this embodiment, in addition to the common reception antennas 153a and 153b, the transmission antenna is also replaced by the common transmission antenna 251, thereby reducing the number of antennas to downsize the compound mode radar device 200.

[0051]

In order to transmit the narrow-band signal and the broadband signal with the one common transmission antenna 251, the compound mode radar device 200 of this embodiment has a constitution provided with the multiplexing machine 271, and the narrow-band signal generated by the narrow-band signal generating part 110 and the broadband signal generated by the broadband signal generating part 120 are multiplexed into one transmission signal by the multiplexing machine 271. The transmission signal multiplexed by the multiplexing machine 271 is transmitted from the common transmission antenna 251.

[0052]

Also in the compound mode radar device 200 of this embodiment, since the narrow-band signal and the broadband signal have center frequencies separated so that their bands may not be superimposed, even if they are multiplexed by the multiplexing machine 271 and transmitted from the common transmission antenna 251 as one transmission signal, there is no fear of affecting each other. The reception signal which is transmitted as one transmission signal, is reflected by the object, and is received by the common reception antennas 153a and 153b is configured so that wave filtration of each signal only may be carried out by LPF131a, 131b, BPF141a, and 141b, similarly to the first embodiment. The processing in the narrow-band reception processing part 130 and the broadband reception processing part 140 thereafter is the same as that of the first embodiment."

(B) Therefore, according to the descriptions of (A)a-e and Figs. 5 and 6 of the drawings, it can be acknowledged that the following invention (hereinafter, referred to as the "Cited Invention") is described in Cited Document 1 (the portions inside parentheses indicate related description parts).

"A compound mode radar device ([0001]) comprising:

a narrow-band signal generating part which generates a narrow-band signal ([0032], [0051]);

a broadband signal generating part which generates a broadband signal ([0032], [0051]);

a multiplexing machine which multiplexes the narrow-band signal and the broadband signal to one transmission signal ([0051]);

a common transmission antenna which transmits the transmission signal multiplexed by the multiplexing machine ([0051]);

two common reception antennas which are provided on right and left sides in order to perform angle detection using a monopulse system, and receive a reflected wave which is transmitted as one transmission signal and is reflected by the object ([0031], [0052]);

a narrow-band reception processing part and a broadband reception processing part which input reception signals from the common reception antennas to obtain detection data ([0032],[0052]); and

a computing part which performs the measurement of an angle based on the detection data inputted, ([0030]),

wherein the narrow-band signal and the broadband signal are set so that their bands may not be superimposed on each other in a high frequency band from 22 GHz to 29 GHz ([0028]),

wherein the narrow-band signal uses FMCW, is generated as the high frequency wave whose frequency is modulated in the shape of the triangular wave according to a control signal outputted according to a control value set in advance by the computing part, and is transmitted through a switch closed only when a request of transmission is issued from the computing part, ([0033],[0035],[0036]),

wherein a narrow-band radar part using the narrow-band signal for angle measurement and a broadband radar part using the broadband signal for angle measurement are switched to operate or are operated in parallel, and wherein the broadband radar part is used in the angle detection to an object at a short distance, whereas the narrow-band radar part is used in the angle detection to an object at a long distance. ([0032],[0046],[0047])" B Known Example 2

(A) Japanese Unexamined Patent Application Publication No. 2007-218690 (the application published on August 30, 2007, hereinafter, referred to as "Known Example 2") which is a publication distributed before the priority date of the application and is cited in the reasons for refusal stated in the examiner's decision, describes the following together with drawings.

a "[0092]

Fig. 21 shows the constitution example of the FMCW radar apparatus which uses the antenna of fractal structure. The FMCW radar apparatus of Fig. 21 is provided with a reception antenna 2101, a transmission antenna 2102, a demultiplexer (DEMUX) 2103, a multiplexer (MUX) 2104, a switch 2119, low noise amplifiers 2106 and 2107, high output amplifiers 2108 and 2109, mixers 2110 and 2111, branch parts (HYB) 2112, 2113, and 2114, a frequency multiplier 2115, an interference detecting element 2116, a radio frequency oscillator 2117, a control part 2118, a variable delay device 2120, a data generation machine 2121, and a baseband oscillator 2122."

b "[0095]

The high output amplifier 2109 and the branch parts 2112 and 2114 constitute the transmission section of a main channel, and the high output amplifier 2108, the branch part 2113, and the frequency multiplier 2115 constitute the transmission section of a subchannel. Based on the control signal from the control part 2118, the frequency multiplier 2115 increases the frequency of the output signal of the radio frequency oscillator 2117 to be N times, and outputs it. The multiplexer 2104 multiplexes the transmission signals of the main channel and the subchannel, and outputs it to the transmission antenna 2102."

(B) Therefore, the following technology is described in Known Example 2.

A technology "provided with a multiplexer which multiplexes transmission signals of a main channel and a subchannel and outputs the resultant signal to a transmission antenna, in an FMCW radar apparatus."

C Known Example 3

(A) Japanese Unexamined Patent Application Publication No. 2002-95066 (the application published on March 29, 2002, hereinafter, referred to as "Known Example

3") which is a publication distributed before the priority date of the application, describes the following together with drawings.

a "[0002]
[Conventional Art] Fig. 1 shows a schematic view of the wireless communication system 1 which provides wireless communication service to the wireless unit 12 in the geographical region 2. The mobile body switching center 3 undertakes the role which establishes and maintains the telephone call between wireless units, and the telephone call between a wireless unit and a wire line unit (for example, a wire line unit 4). An MSC3 carries out interconnection of the wireless unit in the geographical region 2 to a Public Switched Telephone Network (PSTN) 5. The geographical area served by the MSC3 is divided into the spatially separate areas called 'cells'."

b "[0004] A typical base station manages the wireless resource for the base station, and contains the base station controller (BSC) 7 which relays information to the MSC3. For example, the BSC 7 extracts wireless pertinent information such as a pilot signal measured value from an access channel message, in order to facilitate traffic channel assignment. The base station contains the base station transceiver (BTS) 8 a-i and the antenna which the base station uses in order to actually establish a wireless communication link with the wireless unit in the cell.
[0005] There are many different schemes for determining how the wireless unit and the base station communicate in cellular communication. For example, the wireless communication link between the wireless unit and the base station can be defined according to different wireless protocols such as code division multiple access (CDMA) or wideband code division multiple access (WCDMA), and in advance of transmission through the antenna, communication signals on the forward direction link from different BTSs are combined by a combiner / multiplexer 9, and amplified by a high-electric-power amplifier."

(B) Therefore, the following technology is described in Known Example 3.
A technology in which "in a wireless communication system which provides wireless communication service to a wireless unit, a base station contains a base station transceiver (BTS) to establish a wireless communication link defined according to different wireless protocols and an antenna, and in advance of transmission through the antenna, communication signals on a forward direction link from different BTSs are combined by a combiner / multiplexer."

D Known Example 4

(A) Japanese Unexamined Patent Application Publication No. 2006-173895 (the application published on June 29, 2006, hereinafter, referred to as "Known Example 4") which is a publication distributed before the priority date of the application, describes the following together with drawings.

a "[Technical filed]

[0001]

The present invention relates to diversity antenna equipment for mounting on a vehicle, and more specifically relates to diversity antenna equipment which enables it to receive both circular polarization transmitted from an artificial satellite, and vertical polarization transmitted from a ground station."

b "[0013]

When embodiments of the present invention are described with reference to the drawings, Fig. 1 is an explanatory view showing the state where the diversity antenna equipment according to an example of an embodiment of the present invention is attached to an automobile, Fig. 2 is an enlarged view of part A of Fig. 1, Fig. 3 is a plane view of an antenna element shown in Fig. 2, Fig. 4 is an enlarged view of part B of Fig. 1, Fig. 5 is a top-down exemplary view of an automobile shown in Fig. 1, and Figs. 6-8 are characteristic views based on simulations according to this embodiment.

[0014]

The diversity antenna equipment shown in these figures is antenna equipment for mounting on a vehicle which was developed for SDARS (Satellite-delivered Digital Audio Radio Service) with a usage frequency of the 2.3 GHz band. The diversity antenna equipment has a constitution provided with a pair of antenna elements 1 and 2 of a patch antenna structure respectively attached to a windshield 31 side and a rear glass 32 side of an automobile 30, and a multiplexer (signal processing circuit) 5 in which signals received by both antenna elements 1 and 2 are inputted via down converters 3 and 4. The antenna elements 1 and 2 are respectively connected to the down converters 3 and 4 by signal cables 6 and 7 (refer to Fig. 5)."

c "[0019]

Four kinds of reception signals are inputted into the multiplexer (signal processing circuit) 5 via the down converters 3 and 4. That is, signals of a satellite wave and a

terrestrial wave received by the first antenna element 1 are inputted via the down converter 3, and signals of the satellite wave and the terrestrial wave received by the second antenna element 2 are inputted via the down converter 4. The multiplexer 5 chooses and switches to one with good sensitivity among these four kinds of the reception signals, composes the multiple kinds of the reception signals to perform optimization processing of the reception signal, and outputs that as an IF signal.
[0020]
As shown in Fig. 1, the output signal of the multiplexer 5 is inputted into a demodulator 8, and after being demodulated from an IF signal to a digital signal, this digital signal is outputted from the demodulator 8 to a decoder 9 to be converted into an analog signal. Also, the down converters 3 and 4, the multiplexer 5, the demodulator 8, the decoder 9, and the like configure a receiver 10."

(B) Therefore, the following technology is described in Known Example 4.
A technology in which "diversity antenna equipment for mounting on a vehicle is provided with a pair of antenna elements, and a multiplexer in which signals received by both antenna elements are inputted via down converters, the multiplexer choosing and switching to one with good sensitivity among the reception signals, and composing the reception signals to output."

E Known Example 5
(A) A webpage "Frequency Diversity Radar" [online], Radartutotrial.eu, archived on April 11, 2010 (Heisei 22) [searched on December 1, 2016], the Internet <URL: https://web.archive.org/web/20100411054133/http://www.radartutorial.eu/01.basics/rb15.en.html> (hereinafter, referred to as "Known Example 5"), which became available to the public through electric communication linesbefore the priority date of the application, describes the following matters (parentheses indicate translations by the body).

a "Frequency Diversity Radar
In order to overcome some of the target size fluctuations, many radars use two or more different illumination frequencies. Frequency diversity typically uses two transmitters operating in tandem to illuminate the target with two separate frequencies as shown in the picture. "

b "

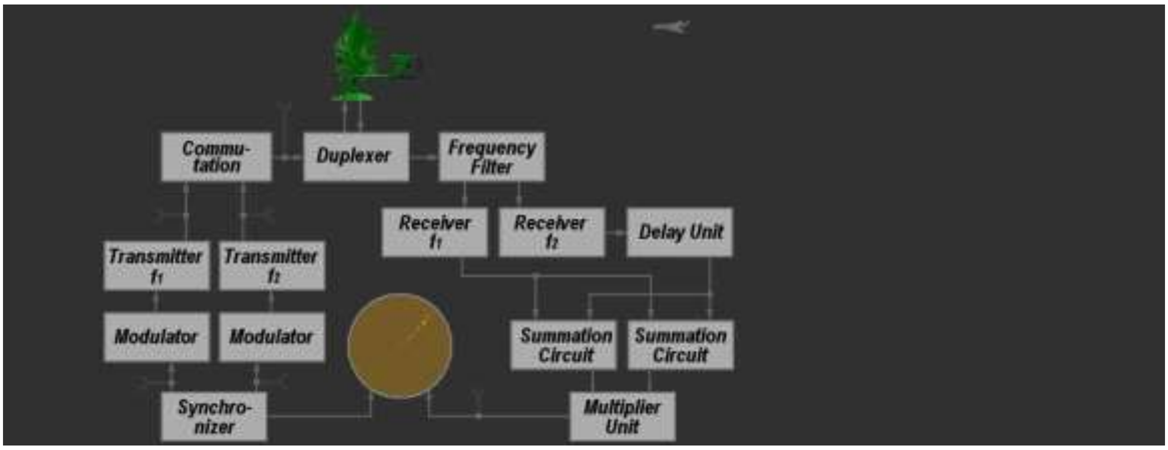

Figure 1: Block diagram of a frequency-diversity radar (Figure 1: Block diagram of a frequency-diversity radar)"

c "Transmitter
The radar transmitter produces the short duration high-power RF pulses of energy that are radiated into space by the antenna."

d "Commutator
A commutator is actually a time controlled switch. The word comes from Latin and means ‘collecting bar’ or ‘call handling.’ Either the commutator works) passively (all incoming RF pulses on the three input jacks will be conducted to the output jack) or actively (the RF input pulses are switched to the output time controlled by separate gate pulses like shown in the figure.) Since very high frequencies must be switched very fast, the commutator uses a wiring technology like the one used by the duplexer. "

e "


Figure 2: Commutator "

(B) Therefore, the following technology is described in Known Example 5.
A technology "in which frequency diversity radar that uses two transmitters operating in

tandem to illuminate a target with two separate frequencies is provided with a commutator, and the commutator works so that all incoming RF pulses inputted from the transmitters are conducted to the output jack or so that the RF pulses inputted from the transmitter are time controlled by separate gate pulses and switched to output."

F Known Example 6

(A) Japanese Unexamined Patent Application Publication No. 2009-186233 (the application published on August 20, 2009, hereinafter, referred to as "Known Example 6"), which is a publication distributed before the priority date of the application, describes the following together with drawings.

a "[0019]

The radar installation 10 is a milliwave radar arranged on the front grille part of a vehicle, for example. The radar installation 10 is equipped with a modulating-signal generator 11, a VCO (Voltage-Controlled Oscillator) 12, a first amplifier 13, an antenna 14 for transmission, a second amplifier 15, an array antenna 20, a switch part 21, a third amplifier 22, a mixer 23, a fourth amplifier 24, a low pass filter 25, an A/D converter 26, and a DSP (Digital Signal Processor) 27.

[0020]

If the modulating-signal generator 11 outputs the modulating signal which modulates a triangular wave, the VCO12 outputs the signal for transmission modulated so that frequency might fluctuate according to the inclination of the triangular wave. This signal for transmission is amplified with the first amplifier 13, and is emitted to a vehicle front by the antenna 14 for transmission. A part of the signal for transmission is amplified by a power distribution unit with the second amplifier 15, and it is outputted to the mixer 23.

[0021]

The array antenna 20 has a plurality of antenna elements. Each antenna element is periodically connected to an apparatus after the third amplifier 22 by the switch part 21. Therefore, a received wave signal received by each antenna element is chosen sequentially, and is outputted to the third amplifier 22. The received wave signal outputted to the third amplifier 22 is amplified with the third amplifier 22, and is outputted to the mixer 23. Thereby, the down conversion of the received wave signal is carried out to generate a beat signal. Without having the switch part 21, a mixing process may be performed to the received wave signal of all the antenna elements. The beat signal is amplified with the fourth amplifier 24, is inputted into the A/D converter 26 via the low pass filter 25, is converted into a digital signal at a timing synchronized

with the modulating signal (or the signal for transmission of VCO12) of the modulating-signal generator 11, and is outputted to DSP27.
[0022]

The DPS 27 applies the principle of the FM-CW radar to the inputted digital signal to compute a distance from and relative velocity with a target serving as a candidate which the information processing apparatus 30 recognizes as an object, and computes an azimuth angle of the target by DBF (Digital Beam Forming). Then, a lateral position of the target is computed from the distance and the azimuth angle, and the distance, the relative velocity, and the lateral position are outputted to the information processing apparatus 30. The lateral position means a deviation from an extension line of a vehicle center axis (refer to Fig. 2)."

b "[0028]

Next, DBF is outlined. As shown in Fig. 5, when the array antenna consisting of the antenna elements arranged at intervals d receives the electric wave which comes from a direction of the angle θ to a central direction X of the radar installation 10, as compared with the propagation path length of the electric wave to an antenna element #1, the propagation path length to antenna elements #2 and #3 ... becomes longer by d sin θ. Therefore, the phase of the radio wave received by each antenna element is delayed by (2π d sin θ) / λ from the phase of the radio wave received by the antenna element # 1. λ is the wavelength of the electric wave. If this delay is corrected with a phase shifter, the electric wave from a θ direction is received in the same phase at all antenna elements, and it means that directivity is turned in the θ direction. DBF is a technology which forms the directivity of an antenna by performing phase and amplitude conversion based on such a principle to synthesize the received wave of each antenna element. Thereby, the azimuth angle of the target can be obtained."

(B) Therefore, the following technology is described in Known Example 6.
A technology in which "a radar installation is equipped with an array antenna having a plurality of antenna elements and a DSP (Digital Signal Processor), and the DSP performs DBF (Digital Beam Forming) forming the directivity of the antenna by applying the principle of an FM-CW radar to a inputted digital signal to compute a distance from and relative velocity with a target, and performing a phase and amplitude conversion to synthesize the received wave of each antenna element, thus computes an azimuth angle of the target, and furthermore, computes a lateral position of the target from the distance and the azimuth angle."

G Known Example 7

(A) Japanese Unexamined Patent Application Publication No. 2002-71792 (the application published on March 12, 2002, hereinafter, referred to as "Known Example 7") which is a publication distributed before the priority date of the application and is cited as a document showing a well-known art in the examiner’s decision, describes the following together with drawings.

a "[0010] The radar installation 1 receives a radar measurement switch signal from the traveling control device 2, and switches a measurement state to carry out measurement. The input of radar measurement switch signal may be received by an input terminal (not shown) provided on the radar installation 1. Measurement states include, for example, a measurement state relating to distance resolution (high resolution mode and low resolution mode), a measurement state relating to the maximum detection distance (a long-distance mode and a short-distance mode), a measurement state relating to width (beam width) with which an electric wave spreads (a wide width mode and a narrow width mode) and the like. For switching the measurement state, any one of the measurement state relating to the distance resolution, the measurement state relating to the maximum detection distance, and the measurement state relating to the width with which an electric wave spreads may be switched, and two or more may be switched. The changes of the measurement state are performed by, for example, controlling at least any one of the frequency of a modulating signal, the cycle of a modulating signal, the transmission power of the electric wave transmitted, and the width (beam width) to which the electric wave transmitted spreads. Furthermore, the output modes of the electric wave are changed by performing the above-mentioned control. The radar installation 1 receives the radar measurement switch signal, and changes measurement parameters including at least one of the distance resolution, the antenna beam width, and the transmission power."

b "[0042] Next, an example in which the distance resolution and a measurable distance are changed by applying the FMCW system which performs the modulation of a triangular wave on transmission frequency to transmit, and measures a distance to and velocity of a forward vehicle, is described by reference to Fig. 2, and Figs. 7-9."

c "[0050] Here, c is light velocity, fm is triangular-wave repeat frequency, and ΔF is the frequency change width of the triangular wave. This formula shows that the measurable maximum detection distance is in inverse proportion to the triangular-wave repeat frequency fm, and the frequency change width ΔF of the triangular wave. Therefore, for example, as shown in Fig. 9(a), in a state C in which the frequency change width of the triangular wave is made to be ΔF and the repeat frequency is made to be fm, and in a state D in which the frequency change width of the triangular wave is made to be $\Delta F'$ and the repeat frequency is made to be fm, a relationship $\Delta F < \Delta F'$ is established. At that time, in the state C, the measurable distance becomes longer than that in the state D. In a state shown in Fig. 9(b), in addition to making the frequency change width differ, the repeat frequency fm is also made to differ. That is, in the state D’, the repeat frequency is made to be fm’, and a relation fm>fm’ is established. At that time, it can be understood that in the state D’, the measurable distance becomes shorter than that in the state C and the state D."

(B) Therefore, the following technology is described in Known Example 7.
A technology which "changes a measurable distance by making frequency change width and repeat frequency of a triangular wave differ, in an FMCW system radar installation which switches a measurement state relating to the maximum detection distance (a long-distance mode and a short-distance mode) to carry out measurement."

H Known Example 8
(A) Japanese Unexamined Patent Application Publication No. H5-19045 (the application published on January 26, 1993, hereinafter, referred to as "Known Example 8") which is a publication distributed before the priority date of the application, describes the following together with drawings.

a "[0010]
[Embodiments] Hereinafter, the embodiments of the present invention are described based on attached drawings. Fig. 1 is a block configuration diagram of an FM radar according to the invention. The FM radar 1 is composed of an FM signal generation circuit 2, sweep rate switching means 3, a power distribution unit 4, a circulator 5, an antenna 6 for transmitting and receiving, a mixing circuit 7, and a distance detection circuit 8."

b "[0018] If the distance to an object is constant, the frequency of a beat signal needs to become high and needs to make the frequency band of the amplifier of a beat signal wide, as a sweep rate is increased. Even if the sweep rate is constant, if the distance to

the object becomes far, the frequency of the beat signal will become high.
[0019] Therefore, in this embodiment, the maximum detection distance of the short-distance detection mode is made to be 80 meters, the maximum detection distance of the long-distance detection mode is made to be 160 meters, their sweep rates are respectively made to be 200 μS and 400 μS, and the maximum beat frequency of the beat signal is made to be 2.132 MHz. The frequency band of the receiving system of the amplifier and the like of the beat signal is made to be a narrow-band with 2.132 MHz.
[0020] As mentioned above, since the sweep rate of the FM modulation transmission wave is delayed according to the maximum detection distance, the maximum beat frequency of the beat signal can be made within a predetermined range. Therefore, the thermal noise of the receiving system can be reduced and the maximum detection distance with predetermined transmission power can be increased by narrowing the frequency band of the receiving system.
[0021] Although in this embodiment, there is described a constitution in which the modulation bias width (for example, 400 MHz from 59.8 GHz to 60.2 GHz) of the FM modulation transmission signal is set constant and the sweep frequency is made to differ, it may be configured such that the sweep cycle is constant and the modulation deviation width is switched between 200 MHz and 400 MHz, for example. Also, a number of switching stages may be made to be three or more.
[0022] Although in this embodiment, there is described the configuration in which the sweep rate for the short-distance and the sweep rate for the long-distance are switched alternately, means for determining that a distance to an object is shorter than a distance set in advance may be provided in the distance detection circuit 8, and the determination output thereof may be supplied to the sweep rate switching means 3, so that the sweep rate switching means 3 may be configured to continuously sweep at the sweep rate for the short distance while the object is at the short distance as determined on the basis of its determination output, and to continue sweeping at the sweep rate for the long distance when there is no object at the short distance. Furthermore, the switching determination of the sweep rate may be performed within the sweep rate switching means 3 by supplying the detection distance information 8a to the sweep rate switching means 3."

(B) Therefore, the following technology is described in Known Example 8.
A technology which "switches a sweep rate (sweep frequency) of an FM modulation transmission signal or modulation deviation width, between a short distance detection

mode with a maximum detection distance of 80 meters and a long distance detection mode with a maximum detection distance of 160 meters."

I Known Example 9

(A) Japanese Unexamined Patent Application Publication No. 2005-252396 (the application published on September 15, 2005, hereinafter, referred to as "Known Example 9") which is a publication distributed before the priority date of the application, describes the following together with drawings.

a "[Field of the Invention]

[0001]

The present invention relates to, for example, an array antenna used for a mobile communication system, and more particularly relates to an array antenna which controls directivity within a vertical plane.

b "[0004]

Then, the antenna used for a base station and the like vertically aligns a plurality of radiating elements to form a linear array, and adjusts a phase and amplitude width to incline; namely, tilt the maximum radiating direction of the directivity within the vertical plane, thereby corresponding to the electric wave interference mentioned above.

[0005]

As conventionally shown in Fig. 5, there is a linear array antenna which has linearly arranged radiating elements 14a, 14b, and 14c vertically to the ground in one sub array block 13a, and has linearly arranged sub array blocks 13a, 13b... and 13h vertically to the ground. The linear array antenna is equipped with phase shifters 11a, 11b... and 11h and amplitude control units 12a, 12b... and 12h respectively on the sub array blocks 13a, 13b...13h, and adjusts a phase and amplitude width about each sub array block 13a, 13b...13h (for example, refer to Patent Document 1). Thus, in the conventional array antenna, a number of the phase shifters is decreased, so that the phase shifters are arranged out of the sub array blocks."

(B) Therefore, the following technology is described in Known Example 9.

A technology which "is equipped with phase shifters and amplitude control units respectively on sub array blocks composed of a plurality of radiating elements, and adjusts a phase and amplitude width about each sub array block, when the maximum radiating direction of the directivity is inclined by adjusting the phase and amplitude width, in an array antenna which aligns the plurality of radiating elements."

J Known Example 10

(A) Japanese Patent Application Publication No. S49-21997 (the application published on June 5, 1974, hereinafter, referred to as "Known Example 10") which is a publication distributed before the priority date of the application, describes the following together with drawings.

a "DETAILED DESCRIPTION

The present invention relates to a radar installation using a phase scanning antenna.

Although in these days, demands on an electronic scanning antenna are increased year by year in a radar and the like, a phase scanning method is one of the most promising methods.

As is well known, as shown in FIG. 1, the phase scanning method of the array antenna arranges a plurality of electromagnetic wave radiation elements 11, 12, 13... 1 n linearly (or planarly), inserts electromagnetic wave phase shifters 21, 22, 23...2n between the radiation elements and a feeding system 30, and controls those by a phase controller 40 to control phases of electric waves radiated from the radiation elements. Since a main beam of the antenna generates in a vertical direction to an electromagnetic wave phase surface, it can be optionally changed in the beam direction of the antenna if the phase shift quantity of the phase shifter is controlled to change the phase surface. Here, if an electronic phase control method is adopted as a phase control method, beam scanning is possible at an extremely high speed as compared with the mechanical scanning method. Conventionally, the phase quantity corresponding to the magnitude of a control current and the like of the phase shifter is given as the electromagnetic wave phase shifter. Although the so-called analog type phase shifter has been used, it is difficult to always give stable phase shift quantity at high accuracy in such an analog type phase shifter. For this reason, digital type phase shifters that digitally control the phase shift quantity, such as latching / ferrite phase shifters, have recently attracted attention.

Generally, the digital type phase shifter comprises N phase shift elements, and can give 2^N kinds of different phase shift quantities. For example, a digital type phase shifter of 4 bits (N= 4) can take total 16 kinds (2^4=16) of phase shift states such as 0°, 22.5°, 45°, ...315°, 337.5° (22.5° increments). If phase scanning is performed by such a digital phase shifter group, as shown in Fig. 2, the phase surface of each element of the array antenna generates a saw-tooth shape wave or a quantization phase error similar to that to a desired linear phase surface S. Fig. 2 shows one example of an opening surface phase distribution in the phase scanning antenna using the conventional digital phase shifter. A lateral axis thereof is opening surface positions; namely, positions H_1, H_2, H_3... H_n of the radiation elements 11, 12, 13... 1n if Fig. 1 is taken as an example. These are divided into a plurality of groups, and the phase shift quantities are decided such as the phase shift quantity of the phase shifter in the first group is set to zero, the phase shift quantity of the phase shifter in the next second group is set to θ_1, and the next is set to θ_2, so that the quantization phase error as shown by a broken line at each opening surface position to the desired linear phase surface S is generated...." (Column 1, line 24 to Column 2, line 33)

(B) Therefore, the following technology is described in Known Example 10.
A technology "which divides radiation elements into a plurality of groups, and decides phase shift quantities such as the phase shift quantity of a phase shifter in the first group is set to zero, the phase shift quantity of a phase shifter in the second group is set to θ_1, and the next is set to θ_2, when electromagnetic wave phase shifters are respectively inserted between a plurality of electromagnetic wave radiation elements of an array antenna and a feeding system and phases of electric waves radiated from the radiation elements are controlled to be optionally changed in a beam direction of the antenna, in a radar installation using a phase scanning antenna."

(3) Comparison / judgment
A Comparison
The Amended Invention and the Cited Invention are compared.
(A) "A common transmission antenna" of the Cited Invention corresponds to "a transmitter antenna" of the Amended Invention.

(B) "A narrow-band signal" of the Cited Invention is "multiplexed" with "a broadband signal" by "a multiplexing machine" and is "transmitted" from "a common transmission antenna" so that it can be said that "a narrow-band signal generating part which generates a narrow-band signal" of the Cited Invention is operably connected to "a common transmission antenna." Also, "a narrow-band radar part using the narrow-band signal for angle measurement" of the Cited Invention is "used" "in the angle detection to an object at a long-distance," so that it can be also said that "a narrow-band signal generating part which generates a narrow-band signal" of the Cited Invention is formed so as to detect "an object at a long distance." Then, "an object at a long-distance" of the

Cited Invention corresponds to "an object within a first range" of the Amended Invention, and "a narrow-band signal" of the Cited Invention is a signal "in a high frequency band from 22 GHz to 29 GHz" and a signal belonging to a band of a microwave, so that "a narrow-band signal generating part which generates a narrow-band signal" of the Cited Invention corresponds to "a first microwave radiation source operably connected to the transmitter antenna, the microwave radiation source being formed to detect an object within a first range" of the Amended Invention.

(C) "A broadband signal" of the Cited Invention is "multiplexed" with "a narrow-band signal" by "a multiplexing machine" and is "transmitted" from "a common transmission antenna" so that it can be said that "a broadband signal generating part which generates a broadband signal" of the Cited Invention is operably connected to "a common transmission antenna." Also, "a broadband radar part using the broadband signal for angle measurement" of the Cited Invention is "used" "in the angle detection to an object at a short-distance," so that it can be also said that "a broadband signal generating part which generates a broadband signal" of the Cited Invention is formed so as to detect "an object at a short distance." Then, "an object at a short distance" of the Cited Invention corresponds to "an object within a second range different from the first range" of the Amended Invention, and "a broadband signal" of the Cited Invention is a signal "which is set so that the band may not be superimposed" "on the narrow-band signal" "in a high frequency band from 22 GHz to 29 GHz" and a signal belonging to a band of a microwave, so that "a broadband signal generating part which generates a broad signal" of the Cited Invention corresponds to "a second microwave radiation source operably connected to the transmitter antenna, and different from the first microwave radiation source, the second microwave radiation source being formed to detect an object within a second range different from the first range" of the Amended Invention.

(D) "A multiplexing machine" of the Cited Invention "multiplexes" "the narrow-band signal" "transmitted through a switch closed only when a request of transmission is issued from the computing part" "and the broadband signal to one transmission signal," and then outputs "the transmission signal multiplexed" to "the common transmission antenna," so that it can be said that the constitution composed of "a switch" and "a multiplexing machine" in the Cited Invention is operable means to connect "a narrow-band signal generating part which generates a narrow-band signal" and "a broadband signal generating part which generates a broadband signal" to "a common transmission antenna." Also, in the Cited Invention, "a narrow-band radar part using the narrow-band signal for angle measurement and a broadband radar part using the broadband signal for angle measurement are switched to operate or operated in parallel," so that it can be said that the constitution composed of "a switch" and "a multiplexing machine" is means for independently or simultaneously outputting "the narrow-band signal and the broadband signal" to "a common transmission antenna." Therefore, the constitution composed of "a switch" "closed only when a request of transmission is issued from the computing part" and "transmitting" "the narrow-band signal" and "a multiplexing machine which multiplexes the narrow-band signal and the broadband signal to one transmission signal" in the Cited Invention, and "a multiplexer operable to selectively connect the first and second microwave radiation sources to the transmitter antenna, so as to independently or simultaneously transmit the first and second microwave radiation sources through the transmitter antenna" in the Amended Invention are common in a point that they are "means operable to connect the first and second microwave radiation sources so as to independently or simultaneously transmit the first and second microwave radiation sources through the transmitter antenna."

(E) "A reflected wave which is transmitted as one transmission signal, is reflected by the object" of the Cited Invention corresponds to "an echo from the first and second microwave radiation sources" of the Amended Invention, so that "two common reception antennas which are provided on right and left sides in order to perform angle detection using a monopulse system, and receive a reflected wave which is transmitted as one transmission signal and reflected by the object" of the Cited Invention correspond to "a receiver operable to receive an echo from the first and second microwave radiation sources, the receiver including a plurality of elements" of the Amended Invention.

(F) In the Cited Invention, "the narrow-band signal uses FMCW, is generated by the narrow-band signal generating part according to the control signal outputted according to a control value set in advance by the computing part," so that it can be said that "the computing part" of the Cited Invention is means operable to control "the narrow-band signal generating part." Therefore, a constitution composed of "a narrow-band reception processing part and a broadband reception processing part which input reception signals from the common reception antennas to obtain detection data" and "a computing part which performs the measurement of an angle based on the detection data inputted" in the Cited Invention, and "a processor operable to receive an echo from the receiver and process the echo so as to determine a place of the detected object, the processor being operable to control the first microwave radiation source so as to generate a desired waveform operable to detect an object within a distance of an intermediate range or a long range of the transmitter antenna" in the Amended Invention are common in a point that they are "processing means operable to receive an echo from the receiver and process the echo so as to determine space information about the detected object, the processing means being operable to control the first microwave radiation source."

(G) "The broadband radar part is used in the angle detection to an object at a short distance, whereas the narrow-band radar part is used in the angle detection to an object at a long distance," so that, except for the following different features, the “compound mode radar device” of the Cited Invention corresponds to "A multi-range radar system" of the Amended Invention.

B According to A(A) to (G), the Amended Invention and the Cited Invention are identical in that each of them is
"a multi-range radar system comprising:

a transmitter antenna:

a first microwave radiation source operably connected to the transmitter antenna, the first microwave radiation source being formed to detect an object within a first range;

a second microwave radiation source operably connected to the transmitter antenna, and different from the first microwave radiation source, the second microwave radiation source being formed to detect an object within a second range different from the first range;

means operable to selectively connect the first and second microwave radiation sources to the transmitter antenna, so as to independently or simultaneously transmit the first and second microwave radiation sources through the transmitter antenna;

a receiver operable to receive an echo from the first and second microwave radiation sources, the receiver including a plurality of elements; and

processing means operable to receive an echo from the receiver and process the echo so as to determine space information of the detected object, the processing means being operable to control the first microwave radiation source," and are different in the following points.

(The different feature 1)

In the Amended Invention, "the first and second microwave radiation sources are independently or simultaneously transmitted through the transmitter antenna" by "a multiplexer operable to selectively connect the first and second microwave radiation sources to the transmitter antenna," whereas in the Cited Invention, "the narrow-band signal and the broadband signal" are independently or simultaneously outputted to "the common transmission antenna" by "a switch" "closed only when a request of transmission is issued from the computing part" and "transmitting" "the narrow-band signal," and "a multiplexing machine which multiplexes the narrow-band signal and the broadband signal to one transmission signal."

(The different feature 2)

"A processor" of the Amended Invention, "determines a place of the detected object," whereas, "a computing part" of the Cited Invention performs the measurement of an angle, but there is no specification about "to determine a place of the detected object."

(The different feature 3)

"A processor" of the Amended Invention is "operable to control the first microwave radiation source so as to generate a desired waveform operable to detect an object within a distance of an intermediate range or a long range of the transmitter antenna," whereas "a computing part" of the Cited Invention is operable to control "a narrow-band signal generating part," but there is no specification about the control "for generating a desired waveform operable to detect an object within a distance of an intermediate range or a long range of the transmitter antenna."

(The different feature 4)

In the Amended Invention, "comprising" "a phase shifter" and "when the first microwave radiation source is controlled to generate the desired waveform operable so as to detect the object within the distance of the long range, and the plurality of elements are divided into a plurality of groups respectively including a predetermined number of the elements, the processor is further operable to start up the phase shifter to set the predetermined number of the elements in one group to be equal phase shifts, in relation to each group," whereas the Cited Invention "performs angle detection using a monopulse system," and is not made to have such a constitution.

C Judgment of the different features

(A) Regarding the different feature 1

A constitution composed of "a switch" and "a multiplexing machine" in the Cited Invention multiplexes "the narrow-band signal and the broadband signal" "to one transmission signal," and outputs that to "the common transmission antenna," so that it can be said that the constitution composed of "a switch" and "a multiplexing machine" has a function as multiplexing equipment, that is a multiplexer.

Then, generally, it is a well-known art that the multiplexer (multiplexing equipment) capable of selectively connecting to a plurality of inputs is used to independently or simultaneously output signals from the plurality of inputs (for example, refer to Known Example 2 ((2)B(B) above), Known Example 3 ((2)C(B) above), Known Example 4 ((2)D(B) above), and Known Example 5((2)E(B) above)), so that it could be easily implemented by a person skilled in the art that the multiplexer capable of selectively connecting "a narrow-band signal generating part which generates a narrow-band signal" and "a broadband signal generating part which generates a broadband signal" is adopted as means for independently or simultaneously outputting "the narrow-band signal and the broadband signal" to "a common transmission antenna," instead of the constitution composed of "a switch" and "a multiplexing machine," in the Cited Invention.

(B) Regarding the different feature 2

It is widely practiced that a position (place) of a detected object is determined by using a processor and performing distance measurement and the like in addition to the angle measurement of the object in a radar device (for example, refer to Known Example 6 ((2)F(B) above)), so that in the Cited Invention, it could be implemented as appropriate by a person skilled in the art that a processor is adopted as "a computing part" and a place of the detected object is determined by the processor.

(C) Regarding the different feature 3

Generally, it is a well-known art that a distance range to be measured is divided into plural pieces, and a waveform suitable for detecting the object within each distance range is generated in an FMCW radar apparatus (for example, refer to Known Example 7 ((2)G(B) above)), Known Example 8 ((2)H(B) above)), so that it could be implemented as appropriate by a person skilled in the art that a distance range "to an object at a long distance" using "a narrow-band signal" of "FMCW" is divided into plural distance ranges (an intermediate range and a long range), and a waveform suitable for detecting the object is employed within each distance range, in the Cited

Invention.

(D) Regarding the different feature 4

Generally, it is widely practiced that an azimuth angle of a target is determined by using an array antenna with beam forming in the FMCW radar apparatus (for example, refer to Known Example 6 ((2)F(B) above)), and generally it is also a well-known art that as a concrete means of beam forming by the array antenna, a plurality of antenna elements are divided into groups, and an equal phase shift is set to the elements belonging to each group by a phase shifter (for example, refer to Known Example 9 ((2)I(B) above), and Known Example 10 ((2)J(B)). Then, in the Cited Invention, it could be easily implemented by a person skilled in the art that "the angle detection to an object at a long distance" using "the narrow-band signal" of "FMCW" is performed by the beam forming of the array antenna, and as a concrete means of the beam forming, the same phase shift is set to each group composed of a plurality of antenna elements by a phase shifter.

(E) Therefore, even when comprehensively considering these different features, effects by the Amended Invention merely fall within a scope that can be predicted from effects by the Cited Invention and the well-known arts, and cannot be regarded as particularly distinguishing effects.

D Therefore, the Amended Invention could be provided easily by a person skilled in the art according to the Cited Invention and the well-known arts, and the appellant should not be granted a patent for it independently at the time of patent application under the provisions of Article 29(2) of the Patent Act.

4 Summary

As mentioned above, since the Amendment violates the provisions of Article 126(7) of the Patent Act which is applied mutatis mutandis pursuant to the provisions of Article 17-2(6) of the Patent Act, the Amendment shall be dismissed under the provisions of Article 53(1) of the Patent Act applied mutatis mutandis by replacing certain terms pursuant to Article 159(1) of the Patent Act.

No. 3 Regarding the invention of the case

1 The invention

As the Amendment was dismissed as No. 2 above, the invention relating to

Claim 1 of the present application is recognized as specified by the matters described in Claim 1 of the scope of claims for patent amended by Amendment 1, and the invention relating to Claim 1 (hereinafter, referred to as the "Invention") is as described in No. 2 [Reason] 1(1) above.

2 Reasons for refusal of the examiner's decision

Reasons for refusal of the examiner's decision are generally that the inventions relating to Claims 1 to 16 of the present application could be provided easily by a person skilled in the art according to the invention described in Cited Document 1 and the well-known arts, and thus, the appellant should not be granted a patent for it under the provisions of Article 29(2) of the Patent Act.

3 Cited Documents

Cited Document 1, Known Examples 2 to 8, and described matters thereof are as described in No. 2 [Reason] 3(2) above.

4 Comparison / Judgment

As examined in No. 2 [Reason] 2 above, although it can be recognized that the Amended Invention adds limitation to the matters necessary for specifying the Invention, the Amended Invention corresponding to one which includes all of the matters specifying the Invention and to which other matters are added, as described in No. 2 [Reason] 3, could be easily provided by a person skilled in the art based on the Cited Invention and the well-known arts, so that, by the same token, the Invention could be also easily provided by a person skilled in the art based on the Cited Invention and the well-known arts.

5 Closing

As mentioned above, the Invention could be easily provided by a person skilled in the art based on the Cited Invention and the well-known arts, and thus the appellant should not be granted a patent for it under the provisions of Article 29(2) of the Patent Act.

Consequently, the present application should be rejected, without examining the inventions relating to other claims.

Therefore, the appeal decision shall be made as described in the conclusion.

December 27, 2016

Chief administrative judge: SHIMIZU, Minoru
Administrative judge: OWADA, Yuki
Administrative judge: SEKINE, Hiroyuki